

File (Pfizer)
This article appeared originally in the July, 1953 issue of Chemical Processing

For centuries, great minds have been contributing ideas we use in our never ending battle with disease. But only in the last decade or two have we seized the initiative in this war against the germ. John E. McKeen, president of Chas. Pfizer and Company, represents an ingenious group who have added knowledge to our store and years to our lives with . . .

THE FAIRBANKS MEM. 248243

MIRACLES FROM MOLDS

PAMPHLET FILE



JOHN E. McKEEN
President
Charles Pfizer and Company



ARGE-SCALE USE OF ANTIBIOTICS is a tremendous achievement in conserving human resources. And, like most of the important technological developments of recent history, the present state of knowledge in the field is the result of thousands of contributions from men in many places and many times.

It is recorded that 2500 years ago, the Chinese were treating boils with moldy soy bean curd. Pasteur learned that common bacteria from the air destroy anthrax bacillus. Ehrlich dreamed of producing specific chemical remedies for common diseases. Just about a quarter century ago, Fleming discovered the bactericidal power of penicillin—though, at the time, “penicillium” was the name of a genus of molds and nothing else.

The learning process inevitably must precede the “doing” process . . . developments of theory, gathering of data, tests and experiments made before antibiotic cures could be realized were all absolutely necessary. Yet, the short time needed to bring these miracle drugs out of laboratories and into hospitals and homes—and at that time, to the world’s battle-fronts—remains as startling as the very materials themselves.

Medical Magic

England’s Dr. Alexander Fleming, of course, was first to know of the bacteria-killing power of the common mold that accidentally inoculated one of his cultures. Fortunately for us, he noted the bacteria-free ring surrounding the mold in the culture dish even though he was not looking for antibiotics. Dr. Howard W. Florey was looking for antibiotics eleven years later when he and his associates at Oxford forced the mold to give up a little of this strange new material, penicillin. The work took months: the result was a little less than a teaspoonful of impure penicillin. The first human test was a failure—but it failed, apparently, because there was simply not enough penicillin available.

An English “Bobby,” badly abscessed and with bloodstream poisoning, was given the meager supply. His case had been hopeless, yet while he was receiving the drug he improved . . . for five straight days. Then the penicillin gave out. His position grew worse. He died.

A second case failed. With more months of work, Florey and his group prepared more penicillin—this time enough. And the third patient

Emeline Fairbanks Mem. Library

to receive this new antibiotic treatment, a boy judged to be beyond hope, was saved. The Oxford group had satisfied themselves that penicillin could work these wonders, but the feeling was general that antibiotics were as miraculous as a magic wand—and just as unattainable.

Production Magic

War had come to England. Florey saw the London blitz first-hand and he determined to do the impossible. He would make these tiny molds give up enough medicine to treat the wounded and dying he saw. Florey and his co-worker, Norman Heatly, came to America with a question, "Can you mass-produce this material?" The answer they wanted was "yes."

Biochemists here had already started to investigate the problems when they arrived. Three companies—Merck, Squibb, and Pfizer—and later 17 other American companies joined with our Government and the English scientists. Conferences of this group indicated that the answer was "yes" and in the spring of 1943 production began. Up to this time, enough penicillin had been made to treat about 400 patients. By the end of the war, enough was produced each year to treat 7 million patients.

Scaling up from micrograms to tons was just as difficult as it sounds. Fermentation broths prepared by Florey had had about one part per million of penicillin (there is more gold in seawater) and the penicillin itself was a fragile material, easily destroyed. One of the first requirements of the commercial process was exclusion of unwanted organisms. Since conditions were to be perfect for penicillin mold to grow, they would also be favorable to other micro-organisms . . . and Nature had provided at least some of these others with the ability to produce a penicillin-destroying enzyme.

Production started with mold grown in milk-bottles. An indication of the task is the fact that 1500 gallons of broth had to be handled to produce enough for one patient sick with an infection. In order to achieve needed production, plants would have had to exceed the milk bottling capacity of the entire United States.

Deep tank fermentation of antibiotics was developed at Pfizer. It had the obvious advantage of eliminating milk bottle operations. Not so obvious is the problem of supplying air to mold in the tank—thousands of cubic feet of air per minute had to be sterilized and fed to the tanks. And when this had been accomplished, there was more research to find what added nutrients molds liked—in order to boost production again.

New Objective—Terramycin

Penicillin was a hard-won beachhead in our war against disease. Several important antibiotics have been discovered and put to use since its exploitation. But all but two of these, prior to 1950, were "narrow spectrum" drugs. In that year Pfizer introduced Terramycin, a "broad spectrum" drug. In addition to organisms which can be handled with penicillin, it is effective against certain gram-negative bacteria, rickettsia (Rocky Mountain Spotted Fever), viruses, and protozoa.

The enormous amount of work that had gone into large-scale production of penicillin was an important factor in Pfizer's ability to bring Terramycin into production within a year after its discovery. John E. McKeen, president, and John L. Davenport, executive vice-president of the company, headed up this whole operation.

Hundreds of people . . . missionaries, airline pilots, and other world travelers . . . contributed to this work by sending soil samples to the Pfizer labs. Jasper H. Kane established the screening program through which samples were tested and Terramycin was found. As director of biochemical research and development, his work extended to finding information needed for design of fermentation equipment.

At this stage of the work, Dr. W. A. Lazier, director of chemical research and development, took over to provide data on Terramycin itself, so that it could be recovered from the process.

Herman A. Poitras, vice-president of manufacturing, assisted by general manager of manufacturing A. J. Greene, directed all parts of the commercial production. Only by strict scheduling were they able to get needed equipment into place and operating fast enough to meet demand. New equipment and plants managed by H. L. Denzler (Brooklyn plant), W. E. Elwood (Groton plant), and B. J. Quinn (Terra Haute plant) kept production at top levels all along the way. And D. C. McClaine, head of the engineering department was kept very busy installing and designing new equipment to meet their needs.

Why was there such a strain to meet production requirements? The volume of antibiotic production in the U.S. comes as a surprise to most people. Total production of antibiotics in 1951 (the last year for which figures are available) was over *one and one quarter million pounds*. Pharmaceuticals have become a billion dollar industry and are still growing. Antibiotics account for more than one quarter of pharmaceutical sales.

Now Where?

Each passing day makes the past complacency of the turn-of-the-century harder to understand . . . and it becomes easier to feel that everything is possible to science. It becomes harder to find technical men who will venture to prophesy. Nonetheless, there are these interesting developments already under study in laboratories.

New antibiotics for uses much like those of present standbys are under investigation or in production.

One of the new ones, Magnamycin, is specifically aimed at germs which have learned to put up with other antibiotics. In one type of infection, fifty strains of bacteria were tested—27 resisted penicillin; 5 resisted Magnamycin.

Combinations of antibiotics and chemical agents may be the key to some therapies. Already streptomycin and isoniazid have been combined (and named streptohydrazid) to fight tuberculosis. And Viomycin, another antibiotic has been developed for the "sophisticated" tuberculosis organism.

Pfizer encouraged livestock people a while back with their studies showing that Terramycin added to animal diets can boost growth significantly. They went on to develop synthetic sow's milk, containing Terramycin. Most recently they have discovered that antibiotics can speed the growth of some plants. Corn plants grown under identical conditions, except that one group was treated with Terramycin, showed these results after four weeks growth: Weight of treated corn—45 grams; weight of untreated corn—23 grams.

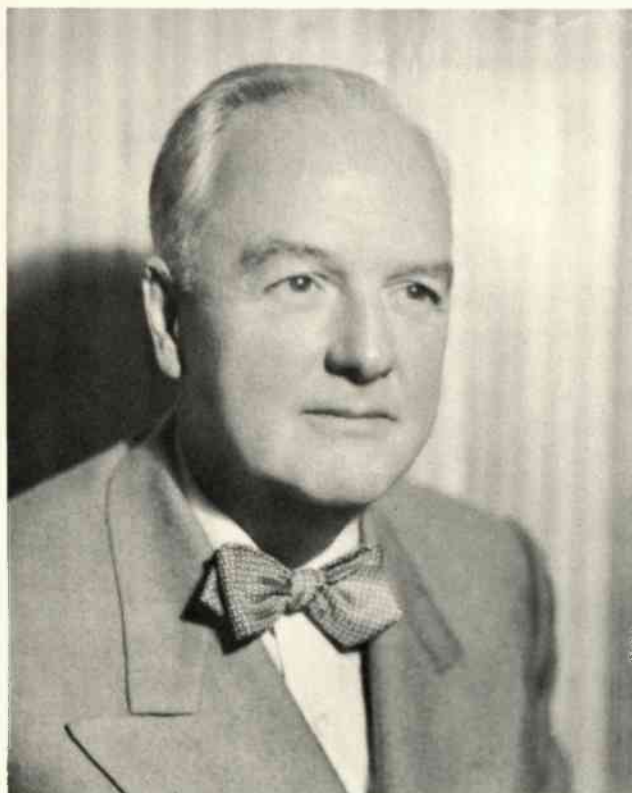
This is by no means a comprehensive list of work which is under way—we can expect that there will be some new miracles as men like the Pfizer team learn more about molds and what they can do for us.

This article appeared originally in the August, 1953 issue of Chemical Processing

There is a story—the writing of which has just begun—and it is akin to those eras of history labeled “the bronze age” and “the iron age.” Dr. William R. Collings represents the combined talents of the Dow Corning group who have given us a new material to build with . . . and who have spurred new thinking with . . .

SILICONES

... A New Chemistry, A New Outlook



DR. WILLIAM R. COLLINGS
*Vice President and General Manager
Dow Corning Corporation*



IN A CITATION (in 1946, when Case Institute conferred an honorary degree of Doctor of Science on Dr. William R. Collings, vice-president and general manager of Dow Corning) these words appeared “. . . high distinction in his career which has linked scientific research with creative industry.” This linkage of research and creative industry is particularly prominent in the development of silicone products.

Dow Corning is spending \$16 million on an expansion program for silicones—products that had not been produced commercially before eleven years ago. Silicones and silicone makers have come a long way in that time, but experts in this field agree that they have only scratched the surface of this new field of semi-inorganic chemistry.

Research on organo-silicon chemicals dates back a full century, but the usefulness of these chemicals as high polymeric materials stems from investigations initiated at Corning Glass Works by Dr. E. C. Sullivan and conducted by Dr. J. Franklin Hyde in 1932. Hyde's work on silicones as high polymers was preceded by the classical study of organo-silicon monomers undertaken in 1900 by Dr. Frederic Stanley Kipping of University College in Nottingham, England. Using the Grignard reaction, Kipping tried to make organo-silicon compounds analogous to hydrocarbons in the form of acids, alcohols, ethers and ketones. He published more than fifty basic papers and produced hundreds of curious compounds, but very few of them behaved like their hydrocarbon analogs.

Hyde, by contrast, was working toward a definite, practical goal. As a member of the Corning Glass research team, he set out to find a material midway between glass and plastic. This “glastic” should be hard and heat resistant as well as flexible. He had a place for less highly polymerized material too. Corning was looking for a bonding and insulating varnish that would be heat-stable enough to permit electrical engineers to make full use of fibrous glass cloth as an insulating material for electric motors.

Creative Thinking

Rayon was born of an attempt to imitate the silkworm. Nylon and later fibers were not imitations—they were *created* to surpass natural fiber properties. But before the “superpolymer” idea got to the stage where superior fibers were considered a possibility, there was basic research . . . creative thinking applied to the “whys” and “hows” of chemistry.

It was in 1927 when Dr. Stine, then director of the company's Chemical Department, started to set up a research program in “pure science.” His goal: to fill in gaps in existing chemical knowledge and to find new facts that might lead to development of new products. One of his first moves was a wise one; he persuaded Wallace H. Carothers to work on the project.

Carothers attacked the problem of polymerization . . . the union of small chemical molecules as links to build giant chain molecules. And it was not long before he had made polyester chain-molecules with molecular weights ranging from 2300 to 5000. These molecules were still too small to be of particular interest.

Attention was then directed to making polyesters of even higher molecular weight. These “superpolymers”—chain-molecules with molecular weights above 10,000, some even above 25,000—proved to be the first synthetic products from which strong, elastic textile fibers might be spun. They had, however, several defects—their melting points were too low, they were too sensitive to water, and they were too generally soluble in organic solvents.

Simultaneously work in the field of polyamides indicated the ability to improve upon the polyesters with respect to these defects. A number of polyamides and polyester-polyamides confirmed this but the products were so refractory as to discourage easy conversion into fibers. In fact, things looked so dark that work was suspended for several months. Then, on the last day of February, 1935, Carothers found the superpolymer—a polyamide—that was to become commonly known as nylon. Tests established the value of the “superpolymer 66,” as it was called, and plans were laid to go ahead with manufacture. Carothers and his associates, however, continued their work of investigating other chemical combinations.

One of the starting materials for the new superpolymer was scarce adipic acid, at that time made only in Germany. Roger Williams of Du Pont's Ammonia Department directed work which resulted in the process for making adipic acid from phenol. Greenewalt directed the work of the Chemical Department in setting up a process for the other starting material, hexamethylenediamine, and for the polymerization and spinning processes. Laboratory work for the diamine process was in the hands of W. A. Lazier. G. D. Graves handled problems of making the finished polymer and of spinning.

Textile operations with respect to the yarn were assigned to the Rayon Department under the direct supervision of G. P. Hoff. Pilot plant operations began in the newly organized Nylon Division of the Rayon Department under the management of E. K. Gladding, formerly assistant manager of the Rayon Technical Division.

Three-and-a-half years from the selection of “superpolymer 66,” pilot plant production was under way and in less than five years, the first full scale plant began operations at Seaford, Delaware. Except for size, this commercial plant was a duplication of pilot plant design. The development of processes for the manufacture of nylon intermediates, polymer, and yarn represents one of the largest cooperative projects within the experience of the Du Pont Company. Some 230 chemists and engineers were at one time or another engaged in the development from the incep-

tion of laboratory work until designs were turned over to the construction engineers.

The original nylon plant at Seaford, Delaware, had been designed for a production of 3 million pounds a year. Before it started in operation, however, this figure was changed to 4 million. And before the plant was completed, facilities had been added to bring production to 8 million pounds a year. By 1940 the plant had stopped growing and started producing . . . and its product, nylon, lived up to the expectations of the more than 230 men who had brought it this far. Good quality nylon was produced from the very first—and it stood on its merits.

Today there are three plants producing many million pounds of nylon fibers a year.

End or Beginning?

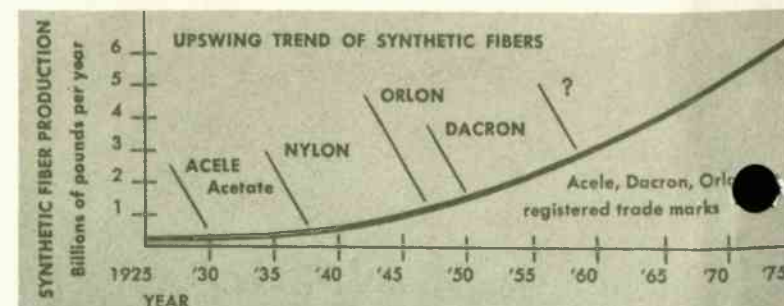
Tremendous achievement though it was, production of practical forms of nylon at practical costs begins to look like the beginning of something bigger. There may be small share-cropper cotton farmers, small sheep herds, but there are no small synthetic fiber producers. Du Pont had spent \$27 million getting the first commercial nylon plant into successful production. The much talked about “little fellow” has never spent so much or learned so much as Du Pont did on this one project.

“All beginnings are hard” according to the German proverb, and when enough had been learned to produce nylon there had been some interesting by-product knowledge turned up, too. It remained for Dr. Emmette F. Izard to pull on some of these loose ends . . . and what he pulled out was another wonder product, “Dacron” polyester fiber.

Izard went back to the point where Carothers had been stumped after drawing his early polyester fibers back in the 1930's.

Carother's fibers had had too low a melting point and had been too sensitive to water. Izard undertook a new investigation of polyesters in 1944, and within a short time produced high molecular weight polyethylene terephthalate. More familiar now as “Dacron,” the fiber spun from this “superpolymer,” has none of the shortcomings of its earlier counterparts. Actually, the same form of the polyester had been independently synthesized somewhat earlier in England by Dr. J. R. Whinfield and J. T. Dickson, but Izard's work was the basis of the rapid commercial development of polyester fibers in this country.

From silk, to rayon, to nylon, to “Orlon,” to “Dacron,” to what? The consuming public seems to have developed a curiosity about what the next miracle product will be. Rayon was fifty years gaining wide acceptance: nylon was prized and fought for at store counters in the first year of its commercial life. This points to a growing faith in the new products . . . significantly, no longer called substitutes . . . of chemical industry. E. I. du Pont de Nemours and its hard working team deserve a large portion of the credit for this change.





Research . . . innovation . . . change. These were key elements in Pfizer operations during 1964, the best year in the Company's 116-year history.

In attaining its highest sales and earnings, Pfizer sold more products and rendered greater service to more people than ever before. As stated in the attached copy of the Pfizer Annual Report for 1964, this record was achieved by a multi-national, worldwide work force of 28,000 employees guided by management policies designed to anticipate, plan and control change.

We are pleased to send the attached copy of the 1964 Pfizer Report. You may find the section on molecular biology entitled "The Great New Promise of Medical Research" (page six) of particular interest. As pointed out here, this new science has given Pfizer and other research scientists new understanding of the nature of disease and the mysteries of life and death. Pfizer worldwide research and development expenditures for 1965 have been budgeted at a new high of over \$21 million. Approximately two-thirds of these expenditures represents an investment in research directed specifically to important targets in the health field.

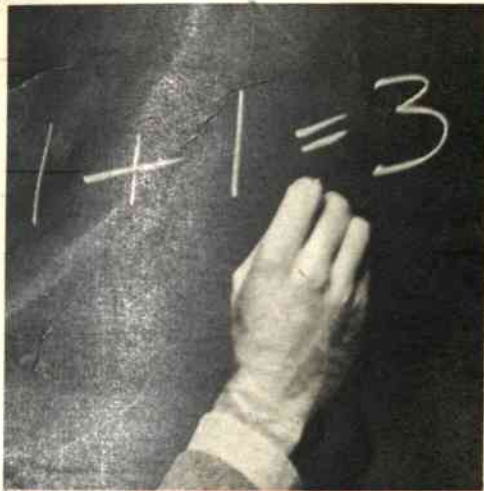
Another section entitled "Communications Firsthand" (page 22) tells of Pfizer's Board of Directors Tour Program. Unique in industry, it is one of the Company's answers to the problem of maintaining communications in an expanding organization.

We hope you will have the opportunity to read the entire Report in detail. If you would like additional copies send your request to: Secretary, Chas. Pfizer & Co., Inc., 235 East 42nd Street, New York, N. Y. 10017

Industries

PAMPHLET FILE

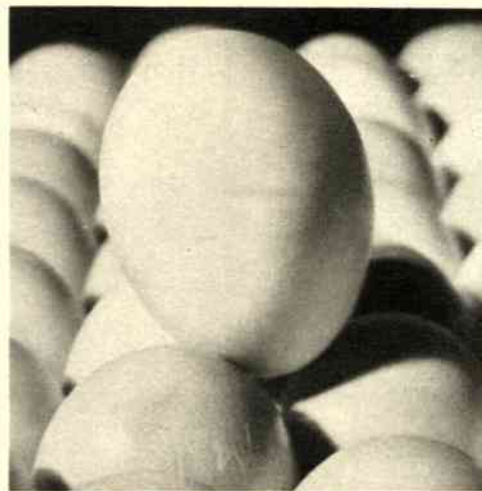
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Bad Addition—Good Medicine
... See Page 4



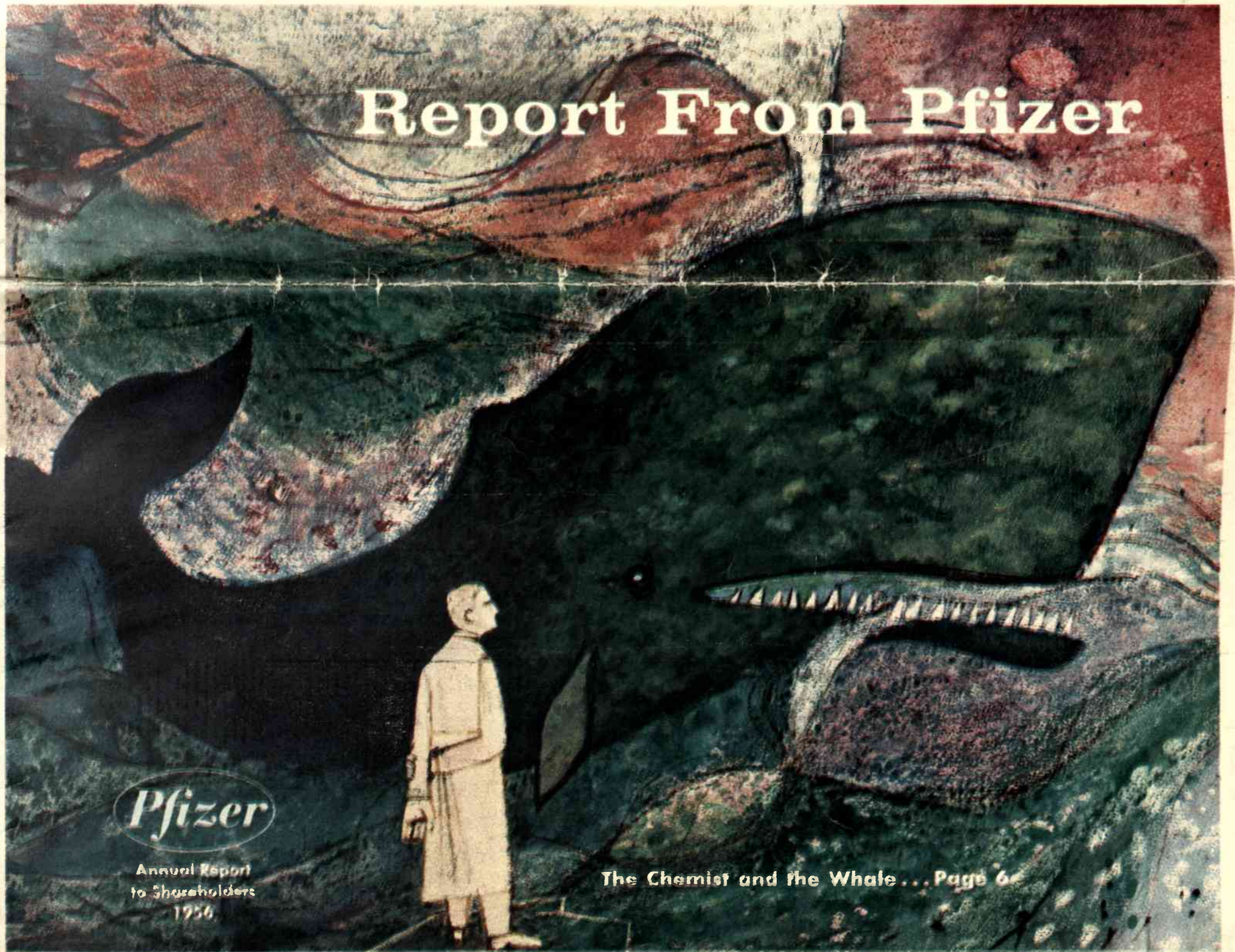
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... See Page 10



Report From Pfizer

Pfizer

Annual Report
to Shareholders
1956

The Chemist and the Whale... Page 6

DO NOT CIRCULATE

"Full disclosure is an ingredient essential to the growth of a free enterprise economy. The principle of providing the shareowners of our great businesses with the facts they must have to make their individual investment decisions is embedded in our corporate way of life."

G. Keith Funston
President, New York Stock Exchange

In keeping with this philosophy, Chas. Pfizer & Co., Inc., consistently has endeavored to provide its shareholders with thorough and frank accountings of its business operations. It is the primary aim of this Annual Report to furnish the more than 22,000 Pfizer shareholders with information on which they can intelligently exercise their judgment as investors. In addition, for the many thousands of newspaper readers who may not have had an opportunity to see just how a typical American corporation reports to its owners, the Pfizer 1956 Annual Report—exactly as mailed to shareholders—is being published as a special supplement in the *New York Times*, Sunday, March 31, 1957.

1956 Annual Report Chas. Pfizer & Co., Inc.

C O N T E N T S

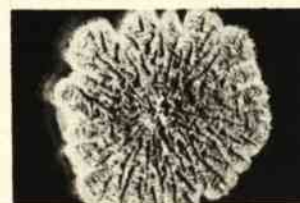
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ANNUAL MEETING—Shareholders are cordially invited to attend the Annual Meeting, which will be held Monday, April 15, 1957, at the Company's main plant, 630 Flushing Avenue, Brooklyn, New York. There will be an opportunity to tour the plant, see displays of the Company's products and visit with executives. In addition, a unique presentation explaining Pfizer agricultural marketing methods is being prepared to acquaint shareholders with this phase of the Company's business. Luncheon in the cafeteria will follow.

Proxy forms and proxy statements together with additional information about the Annual Meeting will be mailed to record owners of Common Stock on or about March 22, 1957.

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Did
you
know?



A mold like this helps make Pfizer-discovered Terramycin one of the physician's major weapons against disease. Terramycin, which hits well over 100 human ailments, has helped to make Company world's leading producer of antibiotics.



Startling growth contrast between untreated plant and plant treated with chemicals called Gibberellins may foreshadow new benefits for agriculture. Pfizer makes Gibberellins by fermentation, is now studying their action and potentialities.



New life for some old oil wells is promised by a recently developed secondary oil recovery method, using citric acid. Fermentation-produced by Pfizer, the versatile chemical is also used in candy, soft drinks, cosmetics and a long list of other products and processes.



From this tangle of wires comes "Abechamycin"—a name without a product—but someday a word like it may label a new antibiotic. It is the first of 42,000 words in a source book compiled by an electronic "brain" and used by Pfizer to select new drug names.

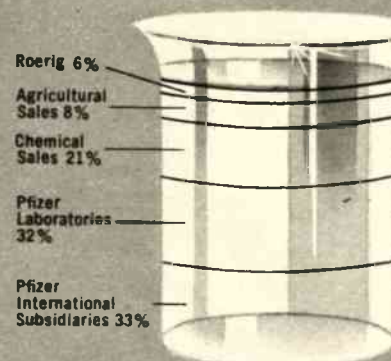


More than 27,000 sea-borne servicemen were the subjects in government-sponsored studies of anti-motion sickness drugs. Pfizer's Bonamine was found most effective, longest-acting of all drugs tested.

The Year at a Glance

1956

Net Sales by Divisions



	1956	1955
Net Sales	\$178,362,196	\$163,794,654
Earnings before income taxes	32,427,979	26,570,967
Income Taxes	14,174,000	11,244,000
Net Earnings	18,253,979	15,326,967
Dividends Paid:		
Common Stock	9,017,721	7,645,152
Preferred Stock	497,409	739,110
Earnings Retained	8,738,849	6,942,705
Per share of common stock:		
Earnings	\$3.36	\$2.94
Dividends paid	1.75	1.55

"Outposts of tomorrow..."

A MESSAGE FROM THE PRESIDENT

Since the dawn of history man has struggled for survival against the forces of nature. Some of the battles have been won, others are still raging. Nowhere is the battle of progress being fought with greater vigor than in those outposts of tomorrow, the research laboratories of science and industry. From each advance in scientific knowledge, from each new discovery, there emerges a brighter outlook for the future and a more imposing challenge. To those of us privileged to help convert the forces of nature to the service of mankind, the challenge has never been greater nor more vivid with promise.

The year 1956 saw Pfizer continue the record of growth and diversification which has characterized its recent history. Sales of \$178,362,196 were up nine per cent over the \$163,794,654 reported for 1955. Net earnings were \$18,253,979, against \$15,326,967 the year before, an increase of 19 per cent. Both sales and earnings were the highest in the 108-year history of the Company.

Earnings per share of common stock after payment of preferred dividends were \$3.36 per share on 5,284,543 shares outstanding compared with \$2.94 in 1955 on 4,959,902 shares outstanding. Total dividend payments on the Common Stock were raised from \$1.55 per share to \$1.75, the sixth consecutive annual increase.

Our business in 1956 benefited from the generally high level of industrial activity, a firmer market for antibiotics sold in bulk, and the introduction of important new products in each of our marketing divisions. However, the sales volume—a record for the seventh successive year—was made possible only through carefully developed selling and promotional programs aggressively carried out by seasoned sales groups operating in highly competitive markets.

Each division contributed to the over-all improvement in profits. Earnings were also influenced by an increase in royalties, including those received as a result of the favorable settlement of the patent litigation on our antibiotic, tetracycline.

DIVERSIFICATION CONTINUES

Continued diversification—both in products and markets—has acted to a great extent as a hedge against the effects of sudden fluctuations in the market position of specific products. This applies particularly to the pharmaceutical field where the development of a more effective competing drug may swiftly alter the relative positions of all the products in the market. No longer is our over-all progress dependent on the success of a single group of products in a narrowly defined market.

Sales of our international subsidiaries, which accounted for approximately a third of the Company's total, were at an all time high and profits were up sharply. Although unsettled conditions in the Near East interrupted our business in several countries, the over-all effect was negligible. Despite this crisis, it is gratifying to note that most countries in the free world are continuing to make steady, sometimes spectacular, economic progress which provides a highly encouraging business background for our Company as well.

Our progress during the year once again confirms our faith in scientific research as a means of expanding our business while making available to humanity the drugs, the chemicals and the agricultural products to improve man's well-being. From the nearly \$8 million (almost 5 per cent of sales) invested in research by the Company in 1956 came a diversity of new products, some of which already have made significant contributions to sales and others which will require additional development time before substantial benefits can be realized.

Chief among the new pharmaceutical products is

the multi-spectrum antibiotic, Sigmamycin—a combination of tetracycline and oleandomycin, both Pfizer discoveries. Sigmamycin is effective against a wide range of infectious diseases, including many bacteria which have become resistant to certain other antibiotics. In treating patients at home or in the office where sensitivity testing equipment is not usually available, the doctor now has an effective wide-range antibiotic providing insurance against the emergence of these resistant germs. The full significance of this development is detailed on page 4.

Record sales and earnings were matched by record output at our domestic and foreign plants. Capacity was increased through the development of new processes, the installation of additional production equipment at several locations and the opening of new plants in Japan and Canada.

PRODUCTIVITY INCREASED

Our scientific and engineering staffs continue to maintain production efficiency at a high level and to improve it where possible. Automation and improved instrumentation are finding increasing application in our synthesis of chemicals, purification and recovery of fermentation-made products, and pharmaceutical packaging operations. These advances are playing a major role in raising productivity.

A further expansion of our manufacturing, research and office facilities is now in the planning stage. Under consideration are projects—both here and abroad—involving expenditures of \$20-25 million in the next two or three years.

Behind the products and statistics in this report stand the 10,000 men and women who staff the Pfizer plants, laboratories, offices and sales groups in the United States and around the world. In their hands lie the continuity and the future of an organization operating in highly complex fields. To encourage an active participation in the business on their part, we have had in effect a broad stock option program covering the vast majority of our employees. At the close of 1956, employees had exercised their options on nearly two-thirds of the stock allocated under the plan terminating March 31, 1957.

Again, looking to the future, we are continuing a well-rounded training program to prepare young executives to take on additional responsibilities. This consists of training on the job and in advanced management courses at some of the nation's leading universities.

Our financial position continues sound and we are fully prepared for the future growth of the Company's business. Our pharmaceutical, food, beverage, agricultural and chemical products are well established in expanding markets. Our research program is geared not only to support our efforts in these fields but to guide the way into new and even more diversified areas. And, above all, our people have the experience, resourcefulness and vision to carry the Company into a new era of growth.

In spite of the uncertainties which hang over the international scene, we view the future with cautious optimism. Our Company and our industry have much to contribute to a happier, healthier world—a world at peace. We share with all Americans the fervent hope that out of the present crisis will emerge a moral climate in which nations and men can live side by side in harmony and in prosperity.

The Board of Directors wishes to express its sincere thanks to the growing family of Pfizer shareholders. For their continued support and assistance, we are genuinely grateful.

John F. McKee

President



Research is the lens through which a chemical manufacturer looks into the future, discerning the shapes of new problems to be solved, new products to contribute to the world's wealth and welfare.



Millions of children like these were born and are growing up under the protecting shield of the Age of Antibiotics—a shield which has warded off afflictions which otherwise would inevitably have killed, crippled or permanently retarded some of them. The 12-year-olds in the picture were born in the era of narrow-range antibiotics, such as penicillin, and grew under the aegis of such broad-range drugs as Terramycin. Now they face an even safer future in the new, third era of antibiotics—that of multi-spectrum combinations like Sigmamycin. (P.S. The dog benefits, too!)

One + One = Three

New weapons to attack stubborn disease germs



Everybody would like to add one dollar to one dollar and get three dollars. Unfortunately, you can't do that with dollars. But certain specific antibiotic drugs can be added together to give a combined potency greater than the sum of the individual potencies. This action is achieved by what scientists call synergism. The word means "working together" and implies enhancement of benefits of agents harmoniously combined to work as a team.

This concept assumed a vital significance in 1956 with the development of Sigmamycin by Pfizer. Sigmamycin is a scientifically formulated combination of two antibiotics, oleandomycin and tetracycline, which is not only effective in virtually every situation calling for an antibiotic, but is also potent against a number of disease-causing bacteria that have become resistant to older antibiotics.

Its launching inaugurated what Dr. Henry Welch, chief of the antibiotics division of the U. S. Food and Drug Administration, has called "the third era of antibiotics." The first era of narrow-spectrum antibiotics was exemplified by penicillin, effective against important but rela-

tively limited varieties of germs. The second era of broad-spectrum antibiotics, such as Terramycin and tetracycline, extended the range of the drugs to include many more kinds of germs. Now the third era of combination antibiotics which deliver a two-way knockout punch against stubborn bacteria is under way.

New turns in antibiotic therapy rest upon years of study of complex problems. Paramount has been the problem of bacterial resistance to antibiotics, a source of concern to physicians ever since the first instances appeared when antibiotics were very young. Some germs, under certain conditions, have a malicious ability to become immune to antibiotics that originally controlled them. As the world's leading producer of antibiotics, Pfizer was among those deeply concerned.

A GRIM, FRUSTRATING STORY

First reports of bacteria resistant to penicillin are almost as old as the drug itself. But it was resistance to streptomycin, the second major antibiotic, which dramatized the problem in the late 1940's. For streptomycin was the first drug to attack the tuberculosis germ

directly in the body; its potentialities were immense; it had made possible the first clinical cure of the disease ever recorded, by preventing its spread in a patient after the focus of infection had been removed surgically.

Yet, almost as soon as streptomycin came into widespread use for tuberculosis, reports told a grim, frustrating story of the well-nigh explosive emergence of bacterial resistance.

Geneticists suggested a theoretical solution. If streptomycin killed off susceptible TB germs, thus leaving the field open for resistant germs to breed and multiply in enormous numbers, an agent which attacked the resistant germs in some different chemically vulnerable part of their armor would redress the balance. This required the discovery of a second drug as potent against tuberculosis as streptomycin. Fortunately, such a drug—isoniazid—was soon forthcoming. Pfizer Laboratories along with others began marketing isoniazid and soon achieved a chemical combination of isoniazid with streptomycin. This compound, Streptohydrazid, markedly delays the emergence of resistant bacteria and has proved to be one of the most effective agents used in the treatment of tuberculosis.

PROBLEM GROWS MORE COMPLEX

Nevertheless, looming problems of resistance became more complex and varied as medical experience with penicillin and other antibiotics accumulated. Not all antibiotics produce resistant strains, since different antibiotics attack germs in different chemical ways.

The discovery of broad-range antibiotics such as Terramycin provided a hopeful way out of the resistance dilemma. These antibiotics brought many hitherto immune microbes under control and vastly extended the scope of the antibiotics revolution. Penicillin, for instance, is active against approximately 22 different infections, streptomycin against about 18, overlapping penicillin slightly. Broad-range Terramycin is effective against more than a hundred human diseases, not to mention many diseases of animals and plants. Further research led to the discovery by Pfizer of tetracycline, itself a powerful broad-range antibiotic.

NEW DISCOVERY HOLDS HOPE

Many research workers hoped that broad-range antibiotics would finally solve the resistance problem by attacking so many kinds of germs in such potent ways that those with resistant potentialities would have no chance to multiply, or that infections would be cured long before the subtle processes of resistance could be completed. This did not turn out to be the case; resistance to the broad-spectrum drugs began to emerge, slowly but steadily.

The search for new drugs to keep a jump ahead of bacterial resistance was a bleak and frustrating prospect which was doomed to certain failure, since the number of possible new antibiotics is unlikely to be infinite. Unexpectedly, Pfizer's discovery of oleandomycin (Marmycin) gave exciting new directions to the search.

By itself, oleandomycin is an excellent agent against many malicious germs, particularly the stubborn staphylococci which cause boils and skin infections and severe respiratory and gastrointestinal diseases. But its unique-



90% of the 1,160,000 prescriptions filled every day couldn't have been filled 10 years ago because the drugs didn't exist then.

ness, with profound implications for public health, lies in its synergistic (mutually intensifying) action with tetracycline.

Laboratory studies demonstrated that Sigmamycin, which combines oleandomycin and tetracycline, is more active against disease germs than equal amounts of the two drugs given separately. A typical test, for instance, showed that tetracycline alone protected 59 per cent of mice infected with a specific germ; oleandomycin alone protected 12 per cent. When the two antibiotics were given in Sigmamycin combination, however, they afforded 90 per cent protection—19 per cent more than the total added effects of the two antibiotics given separately. This is the marvel of synergism—adding one and one and getting three.

Sigmamycin proved equally effective in retarding the emergence of resistant organisms. In one experiment, the test organism increased its resistance to tetracycline alone 1,280 times,

to oleandomycin alone 526 times—but to the combination, Sigmamycin, only four times!

The why and how of bacterial resistance are by no means completely understood; many of its mechanisms are still mysterious even to



Research in antibiotics paid off in the closing of some tuberculosis hospitals. Current investigation of the ataraxics, it is hoped, may obviate the need for some mental institutions.

scientists. Greater understanding undoubtedly will emerge. Sigmamycin, a notable advance, is not necessarily the last and final word. But its launching in 1956 may be fairly said to have ushered in the third era of antibiotics.

PFIZER LABORATORIES MARKETING REPORT

Sales of Sigmamycin by the Division are highly encouraging and are well ahead of the level anticipated. Backed by an aggressive sales effort, Terrabon and Tetrabon, unique new liquid dosage forms of Terramycin and tetracycline, respectively, made strong starts in 1956 and are accounting for a steadily increasing volume. Various Tetracycline (tetracycline) dosage forms showed a slight increase over the year before while Terramycin moved at a somewhat slower rate, although it still remains an important factor in the Company's business. Marketing 12 of the 17 antibiotics now in use for human therapy, the Division offers the medical profession the widest available choice of any company in the world.

Progress has also been gratifying in the field of steroids. Sales of Pfizer Sterane (prednisolone)—used effectively in the treatment of rheumatoid arthritis and bronchial asthma—showed a substantial increase. To control the symptoms and apprehensions associated with these two ailments, Pfizer Laboratories introduced Ataraxoid, a steroid-tranquilizer combination. The response of the medical profession has been highly satisfactory.

Despite the advent of newer steroids used to treat inflammatory skin ailments, sales of Cortril (hydrocortisone) remained strong. A Pfizer discovery, ethamicort, a new steroid which clinical tests have shown to be more effective than the older corticoids, was introduced at the end of 1956 as a dermatological ointment under the name Magnacort. A combination of ethamicort and the antibiotic neomycin—called Neo-Magnacort—was also marketed for the treatment of skin conditions. As in the case of antibiotics, the Pfizer steroids provide the physician with a well-rounded line from which he can make a selection to suit his patient's specific needs.

Also late in the year, the Pfizer Laboratories Division entered a new field: the treatment of high blood pressure and emotional tension. The Company's research teams made available Moderil (rescinnamine), a newly isolated component of the Rauwolfia root from which the drug reserpine is also extracted. Compared with reserpine, the side effects reported from the use of Moderil have been less frequent and less pronounced, an important advantage where an agent of this kind must be administered over a long period.

The anti-motion sickness preparation Bonamine and the nasal decongestant Tyzine are firmly established in their respective fields and are making substantial contributions to over-all sales. In 1956, an experimental merchandising program, including radio, television and national magazine advertising on a limited basis, was started for two proprietary drug products: Candettes, an antibiotic preparation for sore throats, and Bonadettes, a preventive for car, air and seasickness.



The Health Team Behind Modern Medicine

An invisible but all-important ingredient of modern drugs is the unseen teamwork of doctors, pharmacists, manufacturers and researchers whose interlocking skills bring a needed medicine to the patient's bedside. We look at a drug tablet, a seemingly simple thing, without seeing in it the collective minds of indispensable members of the health team who made it, tested it, stocked it and put it at our service.

First, of course, the physician must diagnose illness and decide upon treatment. Even after deciding upon a particular drug, he still faces critical decisions. What form is best— injection, oral tablets or capsules, suspensions, liquids? How big a dose, how often? How long will it probably be needed? Is it compatible with other drugs the patient may be taking? Is there anything in the patient's history to rule out use of the drug?

Many other factors are weighed by the doctor before he injects a drug or writes a prescription. His prescription is a signed professional order to another key member of the health team, the pharmacist. It states the drug or ingredients, quantity, dosage size, and directions for use by one patient, and one alone, whose special needs and condition have been diagnosed.

The pharmacist, a close professional partner of the physician, fills the prescription with hairbreadth accuracy, drawing on skills acquired through years of specialized training and experience. He checks with the doctor if there are any uncertainties, records the prescription carefully and transcribes to a label the physician's exact directions to his patient. A drugstore or hospital pharmacy stocks several thousand drug items; some must be refrigerated, others stored in special ways to insure potency and freshness at all times. Almost anywhere in the United States, thanks to the pharmacist, a prescription drug is no more than an hour away from the patient.

Some prescriptions are compounded by the pharmacist from separate ingredients, while others call for "ready-made" drugs prepared by manufacturers. The pharmaceutical manufacturers employ thousands of scientists to seek better drugs and thousands of specialists who carry out elaborate chemical controls to insure purity, uniformity and standardized potency of every dose. Public welfare is further safeguarded by Federal agencies which

clear the introduction of new drugs and enforce standards and regulatory laws.

Into the tiny capsule that one day may save your life are blended the skills and knowledge of tens of thousands of men and women—the nation's health team.



Live All The Years Of Your Life!



Just one minute old—and with a life expectancy of 70 years, thanks to modern medical advances.



Three-score-and-ten is no longer the age of enforced inactivity, dependency and memories. New concepts of the aging process and its needs help older persons to live fruitfully in the present.



As scientists see the age spectrum now, each period of life from cradle to rocking chair has its own flavor, its own satisfactions and its own tensions. Young people tend to think of the mature years as a future of untrammelled freedom; the aged remember youth in the same way. Actually, each age has its own physical and emotional needs, and no one period of life need be better or worse than another.

While it is true that many people's best creative years lie in their "prime," many others do their best work in their youth, others in their old age. Throughout a long and active life, for instance, Mendelssohn never wrote anything better than his *Midsummer Night's Dream* music, composed at 18; Henry James, on the other hand, got better at his craft every year that he lived, and his last three books were his greatest.

Each phase of living has its peculiar nutritional needs and stress situations. These are the subject of a new field of scientific research called metabolic medicine. One of the leaders in this field is the J. B. Roerig and Company Division of Pfizer, which in 1956—as in previous years—brought forth from the research laboratory new products designed to meet the needs of the individual from his prenatal days to his years of senior citizenship.

Special needs exist even before birth, and perhaps these are most important of all in influencing the course of an entire lifetime for better or for worse. Ample supplies of specific vitamins and minerals are needed for proper embryonic development; if



The daily increase in the world's population—about 80,000—would more than fill a great athletic stadium. With the world's arable land limited, the problem of feeding these extra mouths is taxing scientists everywhere.

The Chemist and



The oddest harpoons in the world are being fired into whales for purposes utterly new in the history of man's age-old quest for food. A unique chemical warhead containing a charge of Biostat is loaded directly into the whaler's harpoon. Biostat is not a strange explosive, but an antibiotic compound developed by Pfizer. Even as it kills the whale, the harpoon releases minute amounts of Biostat into the monstrous body and preserves its freshness by applying antibiotic brakes to microbial processes of spoilage and deterioration.

Experimental use of Biostat by whalers is but one dramatic aspect of new chemical frontiers, pressing forward against mankind's oldest problem, the ever-looming threat of human hunger. Every day the world acquires a brand-new city the size of Springfield, Ill.—80,000 more persons to be fed than existed yesterday. This unparalleled expansion of population has spurred many re-examinations of the gloomy doctrine of Malthus—that population tends to multiply faster than food production.

The curves of population growth and food production may soon cross; this is a cold scientific way of stating that some people, somewhere, will starve if this catastrophe actually occurs. Fortunately, the grim prospect has been tempered by reports of new techniques that may make millions of tons of food,

Infant, youth, adult, oldster... all demanding separate medical approaches

these are not provided by the mother's diet, the fetus may "steal" precious vital minerals from her reserves. Even these may not suffice. Chances of miscarriage, prematurity and malformation are increased by certain vitamin deficiencies, even in the earliest stages of pregnancy. This is also true of such minerals as calcium, indispensable for sturdy development of fetal structure.

Diet may or may not supply all essential materials; hidden deficiencies give little or no warning. Today, most obstetricians make sure that expectant mothers get ample supplies in the form of a vitamin-mineral supplement such as Storcavite, which supplies an easily assimilated form of calcium prepared from finely-processed oyster shells.

FEWER YOWLING BABIES

Once the child is born, almost every mother is confronted with a brand-new health problem—that of colic, an affliction which can turn the first three or four months of motherhood into a howling nightmare. In the past, colic has been treated with all kinds of folk and home remedies—at worst with dangerous results, at best with none at all; mothers simply had to grit their teeth and wait for the infant to outgrow the upset.

Last year, Roerig helped to end the colic problem with the introduction of Bonadoxin Drops, a prescription product. This combination of meclizine and Vitamin B₆ turns most colicky babies into happy ones who no longer yowl against discomfort.

Vitamins are commonly given to children almost from the day they are born, and usually are

welcomed as new adventures in taste by babies who explore the flavors of a strange new world by putting almost anything that is small enough into their mouths. But as children grow older they may become gourmets with violent taste prejudices. Vitamin drops accepted with pleasure in babyhood may be rejected as "fishy-tasting," and tasteless adult-sized capsules as "too hard to swallow."

NO TRIFLING PROBLEM

To solve this problem—by no means trifling, as many frustrated mothers can testify — Roerig launched Viterra Tastitabs, fruit-flavored vitamin-mineral tablets which have since proved as popular with adults as with children.

With adulthood, and indeed before, comes a never-ending series of big and little crises, causing emotional and physical tensions that virtually no one escapes. We all recognize them ruefully in one form or another: work and pressures, domestic and in-law problems, grueling demands, deadline sprints against time, crucial examinations, employer and customer frictions, money and family worries, performances in public, relentless inner drives.

A normal person copes with normal day-to-day tensions as best he can. Often his unaided efforts are not sufficient to break the vicious circle, and personal relations, work and even physical health may suffer. For these millions of normal people, harassed by tensions that drain the zest from life, Roerig in 1956 made available a safe, mild prescription drug called Atarax. It is designed to help restore peace of mind to tension-ridden businessmen, housewives, workers and students. Atarax gently relieves tensions and anxieties but does not lessen alertness, mental keenness or physical activity. Clinical tests have shown it to be so free of side effects that physicians have recommended it for "normaliz-

ing" hyperactive, high-strung children.

The aging process tends to be speeded by deficiencies of vitamins and minerals, hormones, and high-quality protein. Preparations furnishing these three vital categories in scientific balance can go far toward making old age more comfortable, active and productive. Such fortification was supplied in 1955 by Roerig with Neobon, a capsule containing the vitamins, minerals, amino acids and hormones most often deficient in the elderly. In 1956, Neobon was made available in pleasant-tasting, easy-to-take liquid form. Both are available on prescription.

Thus, the aim of modern metabolic medicine—to insure buoyant health at every stage of life by supplying specific needs for each age group—rests upon a broad base of research. Roerig is helping to give a new meaning to the words of an old toast, "that you may live all the years of your life."

J. B. ROERIG & CO. DIVISION MARKETING REPORT

Sales of the J. B. Roerig and Company Division were markedly

ahead of 1955, chiefly as a result of wide acceptance by the medical profession of Atarax, the tension-relieving drug introduced in May. Atarax continues to show sales gains and because of the low incidence of side reactions associated with its use, is commanding an increasing share of the estimated \$150,000,000 market for tranquilizers. In the treatment of common everyday anxiety, Atarax is replacing some of the agents in use over the past few years and is firmly established among the products with which it competes.

Roerig increased the sales of Bonadoxin and this preparation continues to be the drug of choice for morning sickness in pregnancy. Sales of Viterra vitamin-mineral preparations, geriatric products, pediatric nutritional formulations and other specialties continued to be an important factor in the Division's growth.

the World's Food

Action against the threat of human hunger

now wasted, available to mankind in the foreseeable future.

Incredible amounts of food are ruined by spoilage and consigned to garbage dumps. The cost in money is staggering: over a billion dollars a year for losses in fruits and vegetables alone. For every 25 carloads of vegetables shipped from Florida to New York, the equivalent of one carload is discarded as spoiled on receipt. The U. S. Department of Agriculture estimates that spoilage is a major factor in poultry marketing losses which total \$268,000,000 annually.

The human meaning of these cold figures is startling. Even in the United States, despite advanced methods of sanitation and quick transport, one pound of food in every four is lost or ruined by spoilage.

Into these tragic wastelands the modern chemist advances, armed with wonderful new tools and techniques. If food that otherwise would spoil and be wasted can be preserved at its peak of freshness and flavor for a longer time, that much "free" food becomes available to a hungry world. Recent research has shown that antibiotics which control scores of man's diseases can shrink the appalling tonnage of food waste.

For instance, an antibiotic formulation such as Pfizer's Biostat has been found to keep poultry in a prime state of freshness 50 to 100 per cent longer

than is possible with untreated birds. Research workers at the School of Fisheries of the University of Washington have found fresh-caught fish have a longer storage life if packed in ice containing traces of Biostat. University of Illinois food technologists have reported that minute traces of Biostat markedly retard spoilage in ground sausage and smoked hams.

Tomorrow's supermarkets may offer many food products of antibiotics-sustained freshness. Shelf life of prepackaged salad mixes is doubled if ingredients are dipped for five minutes in an antibiotic solution. Slight traces of a broad-range antibiotic added to fresh raw milk delay the onset of souring for a full day, without refrigeration. If the milk is pasteurized first, spoilage may be prevented for periods of two days to several weeks, depending on the quantity of antibiotic and how the milk is stored.

Antibiotics do not cover up or conceal tainted, contaminated, or inferior foods. Ultimately, the consumer eats only the food, not the antibiotic, for the compounds gradually lose activity during storage and are completely destroyed by cooking.

THE MIGHTY AMINOS

Scientists are attacking the food problem on another front: the diet.

People whose diets are ample in quantity may nevertheless suffer from deficient *quality*. Vitamins, minerals and other nutrients are essential for buoyant health. The concept of "hidden hunger" is so familiar in the United States that vitamin and mineral enrichment of foods, particularly cereal products, is almost routine. Virtually all millers add an enrichment formulation, such as Pfizer's Bi-Cap, in making flour.

Now, nutritionists are beginning to wonder if the principle of enrichment has not been much too limited. A great deal of current interest centers upon the possible desirability of amino acid fortifi-

cation of foods. The mighty aminos are key substances of health and vigor; indeed, of life itself.

Everything that is *you*, visible to an observer,
Continued on Page 13

CHEMICAL SALES MARKETING REPORT

The Division had another good year and the upward trend in volume continued. Sales of Pfizer bulk penicillin and streptomycin were up significantly, and prices for these two antibiotics, which have been weak for several years, showed a firmer tone. Hydrocortisone moved at a rate well ahead of the year before, and volume for the Division's bulk vitamins, particularly vitamin A, made encouraging gains.

Another essential nutrient, the amino acid L-lysine, was added to the Division's line late in 1956. The potential uses of this important product are described in the adjoining article.

Despite the development of additional industrial applications, the over-all market for citric acid was lower than the level anticipated for 1956. Among the factors contributing to the slower demand was the unseasonably cool summer weather in many parts of the country, which adversely affected the beverage industry, a traditionally large consumer of citric acid. The Citroflex esters of citric acid, increasingly popular as plasticizers because of their non-toxic properties, showed a satisfactory sales gain, with significant quantities going to the packaging industry for use in food wrappings. Among the new experimental applications with a moderately large potential market is the use of the acid to help avert well plugging in the recovery of oil from partially depleted wells.

With acceptance by the Food and Drug Administration, the Division in the fall began marketing the antibiotic product Biostat, designed for use by poultry processors to extend the freshness time of their broilers and turkeys in the channels of distribution. Commercial sales of Biostat are already under way and represent a modest beginning. However, this application is undoubtedly only the forerunner of other uses of antibiotics to maintain food freshness, and Pfizer is optimistic about the long-term outlook in this field.

Revolution— Down on the Farm

**From faster-growing poultry
to more eggs per hen**



Calves and pigs, beef cattle, poultry and lambs are growing faster than they used to. Hens are laying more eggs. Cows are giving more milk. Altogether, the barnyard is a considerably

more frisky and spirited arena than it was a couple of decades ago. This unparalleled upsurge of animal vitality has been stimulated by scientific discoveries, most of them unexpected and surprising even to scientists.

The result has been a quiet revolution in the economics of livestock and egg production. Everybody benefits. More meat, milk or eggs produced per pound of feed can mean better values for the consumer and higher profits for farmers, who have not fared so well as other segments of our economy in recent years.

Much of these gains can be credited to addition of mere traces of antibiotics to animal feeds. The first and of course the most important use of antibiotics is for the cure and control of human diseases. In the beginning, penicillin was scarce but fermentation processes, in which Pfizer has specialized, soon broke production bottlenecks. Discovery of broad-spectrum antibiotics such as Terramycin, which control many more kinds of germs than penicillin, opened up new areas. Veterinary uses for control of costly animal infections were obvious. But discovery that minute amounts of Terramycin unlocked mysterious forces of life and growth in healthy animals was quite unforeseen.

Cold figures are impressive. Antibiotic feed supplementation has helped to increase the income of the nation's broiler industry by an estimated \$20,000,000 a year. The amount of poultry meat produced per 100 pounds of feed has doubled; turkeys are year-round staples rather than annual Thanksgiving treats. Traces of antibiotics such as Terramycin added to animal feeds bring livestock to market sooner than was once possible, and at less cost. Milk production per cow has risen nearly 25 per cent in the past two decades. Antibiotics account for much of these impressive gains, though other advances are important.

New surprises continue to emerge from biological research. For instance, news that egg production is boosted by fortifying poultry feeds with minute amounts of Terramycin emerged in 1956 as a result of several years of research conducted by Dr. C. W. Carlson of the



The farmwife is the traditional custodian of the barnyard flock. New discoveries in poultry nutrition promise more "egg money" for her as well as the commercial growers—and more eggs for the customer.

South Dakota Agricultural Experiment Station. Confirmation has since come from other investigators at many other stations.

AN EXTRA EGG

Their results show that addition of 50 grams (less than two ounces) of Terramycin to a ton of laying feed gives, on the average, about one *extra* egg for each four eggs an unfortified flock would normally produce.

Pfizer agricultural research scientists developed Terramycin Egg Formula, a completely water-soluble mixture of Terramycin and essential vitamins. The farmer can buy it in jars at his local feed store, drugstore or hatchery. He merely adds it to the hens' drinking water, as little as one teaspoonful to 10 gallons of water. This minute addition increases egg production in several ways.

Pullets start laying sooner, helped by antibiotics to overcome the stresses of coming into production. Laying hens produce more eggs from the second through the eighth month, the normal span of peak production. Hens lay longer and produce more eggs *after* the eighth month when production normally tends to fall off. There are fewer laying slumps—setbacks

in egg production caused by extremes of hot or cold weather or stresses following vaccination. Laying slumps are often symptoms of poultry diseases—blue comb, chronic respiratory disease, hexamitiasis and synovitis. Terramycin, the experiments show, helps prevent the ailments and the resulting laying slumps.

These advantages are important to farmers who are uncomfortably squeezed between rising

Conditioning feeds containing Terramycin help cattle adjust to feedlots, prevent shipping fever outbreaks.



production and selling costs and diminishing prices for their products. In general, farm products cost 19 per cent more to market in 1955 than they did in the 1947-49 period, but payment farmers received for these products was 15 per cent less. Eggs, which require little processing, are one of the few farm products on which marketing costs have not skyrocketed during the past ten years. Egg production can be the primary business of the farm or an important source of side income; often the farmer's wife manages the flock. Any extra profit earned on eggs helps to "ease the squeeze" and improve the family's cash position.

\$1 MORE PER HEN PER YEAR

Statistically, Terramycin Egg Formula increases egg production from 6 to 37 per cent; the average works out to 25 per cent more eggs. Feed efficiency (the ratio between eggs produced and feed consumed) can be improved from 3.7 to 18 per cent. In terms of money, this means extra profits ranging from \$173 to \$1,150 per thousand birds per year. In round figures, Terramycin can increase profits for the egg producer as much as a dollar per hen per year.

Antibiotics have played much the same therapeutic role in reducing animal disease as they have in controlling human illness. But the phenomenon of growth stimulation remains to a great extent a mystery. No one has explained to the satisfaction of all scientists just why minute quantities of antibiotics such as Terramycin make pigs, beef cattle, calves, broilers, turkeys and lambs grow faster and hens lay more eggs.

Ever-new surprises of profound benefit to man may be expected from research, and their agricultural aspects will undoubtedly continue to improve the economic status of the nation's hard-pressed food producers.

AGRICULTURAL SALES MARKETING REPORT

Aided by a more stable domestic farm economy, the Agricultural Sales

Division registered a modest gain in volume over 1955. Terramycin feed supplements, particularly those with high antibiotic levels, moved well as farmers took advantage of new scientific findings to provide their livestock with protection against disease and reap the weight-gaining benefits of the antibiotic. The Division began selling Terramycin supplements for use in beef-conditioning feeds for the control of shipping fever, a serious disease costing cattlemen \$25,000,000 annually. Alert salesmanship coupled with strong promotion through newspaper, radio and television advertising boosted sales of the Division's animal health products sold directly to the farmer through feed stores and drugstores.

Newest application for Terramycin on the farm and potentially one of the largest markets is the use of this Pfizer antibiotic to increase egg production in laying flocks. Besides making Terramycin available to feed manufacturers, the Company in 1956 introduced Terramycin Egg Formula, a soluble powder mixture containing Terramycin and the essential vitamins, which farmers may purchase at feed stores, hatcheries and drug outlets and add to the hens' drinking water. Both the Terramycin Feed Supplement and the Egg Formula are selling well and should contribute significantly to the Division's sales in 1957.

As part of a continuing program of expansion in the agricultural field, the Company in 1956 acquired the exclusive rights to a patent covering a device used for injecting diethylstilbestrol pellets to produce a temporary caponizing effect on poultry and stimulate the growth of beef cattle. The Company has started to produce and sell the patented injector called an implanter, and the Capette brand of diethylstilbestrol pellets, formerly made by Wick and Fry, Inc., of Cumberland, Ind. Pfizer was already producing a Terramycin-diethylstilbestrol feed supplement used as a growth factor in beef cattle feeds, and the pellets will round out the Company's position in this important market.



RESEARCH AND DEVELOPMENT

Assisting at the Birth of the Future

Research is Pfizer's lifeblood. Complex and tortuous, it reaches out far beyond the popular concept of the laboratory with its disorderly array of Bunsen burners, Erlenmeyer flasks and snake-like glass piping. Pfizer research is a resident physician administering a new antibiotic to a group of patients at a San Francisco hospital; it is a young Ph.D. on a Pfizer grant synthesizing a series of experimental tranquilizers at a large university; it is a Pfizer Technical Service man helping to formulate a vitamin-fortified breakfast cereal at the mid-western plant of a giant food concern; it is a technologist feeding an experimental ration to a pen of hogs at the Pfizer Agricultural Research and Development Center in Terre Haute.

More than any other single factor, research can spell the difference between a successful year and a mediocre one. In 1956, Pfizer research was diversified as well as productive. It made available to the marketing divisions important new antibiotics, steroids, tranquilizers, chemicals and nutritional factors for humans and animals. Equally important were a number of improved processes for such products as vitamin A, thiamine and the steroids.

The soil-screening program for new antibiotics is being carried on without letup in the hope that Pfizer scientists can isolate even more effective agents for human and animal therapy and for controlling plant diseases. Steroid research, from which the hydrocortisone derivative, ethamicort, was derived last year, continues to bear results, and several new products for the treatment of arthritis and skin disorders are in the early stages of development. Follow-up clinical work with Viadril—announced in 1955 as the world's first steroid anesthetic for human use—has been encouraging, and the Company plans to market it on a limited basis this year here and abroad.

Several important human ailments for which known therapeutic agents are not fully effective are occupying an increasing share

of Pfizer's research attention. Among them are mental disorders, atherosclerosis, hypertension and peptic ulcers.

For a number of years, Pfizer scientists have been working closely with leading universities and private foundations engaged in the search for drugs to treat cancer. To coordinate all research in the use of chemical and antibiotic agents to treat this disease, the Company recently established the John L. Smith Memorial for Cancer Research. In the months ahead, this new group expects to extend the scope of its activities in this field.

Pfizer scientists continue to make important use of radioactive isotopes as "tracers" to determine in greater detail just why and how antibiotics and other medicines exert their therapeutic effect on the human body. Basic research, employing these isotopes, is also being carried on to uncover the factors which play a role in disease susceptibility. From this study may come a clue to why, for example, under identical conditions one person will catch pneumonia and another will not.

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In the field of industrial chemicals, our researchers are continuing their investigation of new derivatives of established organic acids made through fermentation techniques. In the series now under test are products which give promise as surfactants and detergents, two fields entirely new to Pfizer.

The agricultural research group, taking into consideration the farmer's economic plight, is placing increasing emphasis on the development of new antibiotic, vitamin, and hormone livestock feed supplements designed to improve feed efficiency and lower over-all feeding costs.

As in the past few years, a significant proportion of the Company's research work is being conducted at leading educational and medical institutions through Pfizer grants-in-aid. Under this program, several European research organizations are for the first time working on projects for the Company.



Company invested nearly \$8 million in medical, chemical and agricultural research in 1956. Laboratories are at Brooklyn, Groton, Conn., and Maywood, N. J., (above) where researchers use radioactive isotopes as tracers to find out how drugs work.



700-acre Pfizer Agricultural Research and Development Center near Terre Haute, Ind., is devoted to study of animal nutrition and veterinary medicine. Here staff veterinarian administers Terramycin eye pellet to treat disease similar to human pink eye.

The Right Drug at the Right Time... All Over

The best medicines are useless—if they're not at hand



One night last fall, a two-year-old infant boy lay dying in his crib in the hospital of a Cuban orphanage, suffering from a complicated intestinal infection. Dr. Humberto Faz Tabio, head physician at the hospital and prominent Havana pediatrician, had tried sulfa drugs, penicillin and streptomycin. Other antibiotics and vitamins had been injected into the child's tiny, emaciated arms. Twenty-one days of treatment had passed and only blood transfusions and glucose were now keeping him alive. The medical report that night described his condition as "critical, comatose."

As a last resort, Dr. Faz Tabio called a colleague, Dr. Salvador Bonilla-Sosa, Pfizer manager in Cuba. If no available drug would help, the pediatrician asked, what about an experimental antibiotic not yet generally available. He would try anything.

Dr. Bonilla-Sosa informed him that there was a new Pfizer drug, no longer experimental, which had been reported on that week at a scientific meeting in the United States. The scientists said it often worked when other drugs failed. "We have the drug," Dr. Bonilla-Sosa told him. "A small amount . . . for investigation only."

That night, the precious capsules of Sigmamycin were rushed to the hospital. Twenty-four hours later the child's fever had begun to drop. Within three days he was eating. In a week he was sitting up.

Rare emergencies of this sort are a reminder that the best medicines are useless unless available when needed.

Problems of supplying lifesaving medicines to the free world—the right drug at the right time in Venice or Havana, Saigon or Rio de Janeiro—are exceedingly complex, interlocked with the responsibilities and activities of thousands of people in and out of the industry.

DOZENS OF OBSTACLES

Before a product from any of Pfizer's research laboratories can reach any point on the globe, there are dozens of obstacles to be hurdled, largely because supplies for most countries are imported from some other part of the world. Therefore, the initial problems usually involve international shipping arrangements, import licenses, currency exchange laws and customs regulations. Once the product is actually available in the country, there is a program of local clinical testing. Meanwhile, action is being taken on trade-mark clearances, price control approvals and government sanction of manufacture and sale. The latter may take anywhere from a few weeks to a year or more.

When the Pfizer product is being manufactured locally, production and quality requirements must be maintained in accordance with the drug administration laws of the country and in keeping with Pfizer's own standards. Vials, bottles and capsules of suitable quality must be made available on a satisfactory schedule. Power, raw material and water shortages frequently plague Pfizer plant managers and those of the Company's suppliers, while in some parts of the world excessive heat and humidity pose unique production, packaging, shipping and storage problems.

In solving these problems, Pfizer International, which is only six years old, has evolved and refined a system of international management which may well be unique in American industry. One simple concept is basic to the entire system: each country can best be served if it is considered an individual domestic market rather than a segment of an international pattern of export trade.



THE OLD AND THE NEW: Pfizer antibiotics, being placed aboard a sampan at Hong Kong, will be loaded on freighter for shipment to Korea. Pfizer distribution center in Hong Kong serves wide Far East area.

A notable example of establishing a complete operating company abroad may be seen in Great Britain, one of the first Pfizer overseas operations. There, step by step, Pfizer has set up complete facilities—basic fermentation, pharmaceutical processing and packaging, research, distribution and promotion—for its pharmaceutical, chemical, agricultural and veterinary products. At the end of the first full year of production, last fall, Terramycin and Tetracycline were being produced at full plant capacity. Consequently, a program of expansion was decided upon and is now under way to provide for the manufacture of newer products such as Sigmamycin, the steroids and other drugs produced by fermentation and organic synthesis. When the expansion is completed in 1958, a versatile unit will be serving Great Britain and many parts of the sterling area.

Research and development programs, keystones of chemical and pharmaceutical progress, are also under way. A clinical research program has been conducted in Britain for some years. In 1956, Pfizer Ltd. completed laboratories which permitted the beginning of pharmaceutical research to serve local needs. Facilities for pharmacology and basic chemi-



THIS BASIC MANUFACTURING PLANT at Sandwich, England is representative of Pfizer International's expanding facilities abroad. Fermentation was begun at this plant in 1955. A complete line of Pfizer products is manufactured here for overseas markets best served from the United Kingdom.

cal research have also been blueprinted to round out plans for a complete research program.

Following the same road in Latin America, Pfizer opened a pharmaceutical packaging plant in Argentina and shortly afterward purchased land for the construction of a basic manufacturing plant, which will be the Company's largest fermentation unit outside the United States and Britain. As in England, this will gradually become a fully integrated operation, and similar plans are under consideration for other major countries of the world.

NEW FAR EAST SERVICE

Quite different problems exist in the vast Far Eastern area, which ranges thousands of miles from Korea and Japan down to Australia and New Zealand. It has required as long as six to eight weeks to deliver an order to Viet Nam, for instance. While plants have been established in Japan, the Philippines and Australia, the vastness of this area also requires strategically located shipping and storage points. For example, to serve the area that runs from Singapore to Formosa, a central warehouse was established in Hong Kong. The Pfizer warehouse there, with its modern facilities for storing pharmaceuticals, sets new standards for this part of the world. Immediate shipment and rapid delivery can be made from stock. This can be of vital significance in the event of disasters or epidemics, when large supplies of antibiotics are needed urgently.

Victories of lifesaving drugs in restoring desperately ill patients to health are infinitely more dramatic than the complex international lifelines of drug supply and distribution. Yet behind each victory in an individual patient lies the unseen miracle of distribution which assures that the right drug will be available at the right time.

PFIZER INTERNATIONAL MARKETING REPORT

Abroad, Pfizer International reached a new high in sales volume in 1956, exceeding the previous year by ten per cent. Earnings showed an even more significant increase. This rise in business took place in virtually all countries, reflecting a healthy general growth of the Company across the world.

Accounting for this result is the cumulative effect of some years of steady building, increasing efficiencies in operation, and a constantly augmented promotional effort. The intensified promotion campaign launched in the latter part of 1955 made important contributions to the 1956 results. Moreover, many markets which were marginal in previous years achieved the sales volume necessary to begin yielding a more significant profit.

The two basic fermentation plants erected in England and France in 1955 began operating at capacity last year. The year 1956 also marked the opening of a fermentation plant in Japan, the inauguration of a new packaging plant in Canada and the virtual completion of the Chilean plant. New sales offices were opened in Austria, Denmark, Australia, Hong Kong and Chile.

The extension of production and distribution activities overseas was accompanied by increasing stability in the operation of Pfizer facilities. There was an ever-growing "know-how" within the production groups in the various installations abroad. There was also an increasing mastery of successful merchandising and distribution techniques. As a result, there was a decline in production costs in the manufacture of Pfizer products abroad with only a slight increase in the promotional and administrative expenses over those of the last half of 1955.

The year 1956 also saw continuation of the program of expansion of manufacturing facilities in other parts of the world. Approval was given to projects calling for the construction of new plants in Argentina, Italy, Turkey and Mexico, and for the expansion of existing plants in England, France and the Philippines.

the World



Chas. Pfizer & Co., Inc. and Subsidiary Companies

Statement of Consolidated Earnings
and Summary of Earnings Retained and
Employed in the Business

year ended December 31

	1956	1955
Net sales	\$178,362,196	\$163,794,654
Cost of goods sold	\$ 91,439,955	\$ 87,016,696
Selling, general and administrative expenses	57,308,246	50,980,075
	<u>\$148,748,201</u>	<u>\$137,996,771</u>
Earnings from operations	\$ 29,613,995	\$ 25,797,883
Other income	5,819,690	3,087,037
	<u>\$ 35,433,685</u>	<u>\$ 28,884,920</u>
Other deductions	3,005,706	2,313,953
Earnings before provision for taxes on income	<u>\$ 32,427,979</u>	<u>\$ 26,570,967</u>
Provision for taxes on income — Note 2:		
Federal taxes on income	\$ 11,736,000	\$ 9,342,000
Foreign taxes on income	2,438,000	1,902,000
	<u>\$ 14,174,000</u>	<u>\$ 11,244,000</u>
Net earnings for the year — Note 3	\$ 18,253,979	\$ 15,326,967
Earnings retained and employed in the business at beginning of year	64,272,256	57,329,551
	<u>\$ 82,526,235</u>	<u>\$ 72,656,518</u>
Cash dividends paid:		
Cumulative preferred, initial series 3½%, \$3.50 per share	\$ 127,807	\$ 148,860
Cumulative second preferred, initial series 4%, \$4.00 per share	369,602	590,250
Common, \$1.75 per share in 1956 and \$1.55 per share in 1955	9,017,721	7,645,152
	<u>\$ 9,515,130</u>	<u>\$ 8,384,262</u>
Earnings retained and employed in the business at end of year — Note 8	<u>\$ 73,011,105</u>	<u>\$ 64,272,256</u>

See explanatory notes on following page
which are an integral part of this statement.

What's Behind the Figures?

Increased volume in each of the five marketing divisions in 1956 contributed to the highest sales total in the Company's history. Generally speaking, prices for the year were stable with some firming evident in penicillin and streptomycin prices, which had been falling for several years.

The important relationship between cost of goods sold and sales was reduced by two per cent through improved production efficiencies and a relative increase in the sale and distribution of more profitable items.

For the first nine months of 1956 the percentage relationship between selling, general and administrative expenses and sales remained unchanged from the year before. However, initial advertising and promotion incident to the introduction of Sigmamycin, Matromycin, Moderil, Magnacort and other products in the last quarter raised the over-all selling, general and administrative expenses for the year to a level one per cent higher than for the year 1955.

Royalty income from foreign licensing of the Company's patents and trade-marks continued to increase. This factor, when coupled with royalties accruing from the Company's patents on tetracycline, yielded a total of "Other Income" ap-

proximately one per cent higher in relation to sales than in the prior year. It should be noted that retroactive royalties from settlement of the tetracycline litigation, included in the 1956 results, were equivalent to approximately \$.07 per common share, based on the shares outstanding at the year-end.

Profits before taxes were approximately \$32,400,000, compared with \$26,600,000 in 1955, an increase of 22 per cent. Expressed as a percentage of sales, the 1956 "Net Before Taxes" was 18 per cent of sales, whereas the like relationship for 1955 was approximately 16 per cent.

As the program of manufacturing and selling in markets abroad as opposed to selling to these markets from the United States progresses, profits from operations overseas become increasingly subject to foreign taxes. The result has been a modest increase in the Company's over-all tax rate.

Cash and marketable securities including U. S. Treasury Tax Anticipation Bills amounted to approximately \$26,100,000 at the end of 1956, an increase of \$4,200,000 over the position at the prior year-end. During the year over-all working capital increased by \$9,200,000 to

a total of \$72,600,000. Expenditures for capital items came to \$3,700,000, about the same as in 1955. Under consideration and in the planning stage are projects of a capital nature which for the next two or three years may call for the expenditure of sums aggregating \$20-\$25 million. However, it does not appear likely that any security financing will be required for these capital outlays.

During the year, as a result of conversions of 4% Cumulative Second Preferred Stock and the acquisition of shares of both classes of preferreds for cash at satisfactory discounts, the par value of these issues in the public's hands was reduced from approximately \$19 million to \$7 million. As a result of the conversions of preferred and the exercising by employees of options for 100,500 shares of Common Stock, the outstanding Common Stock increased during the year from 4,959,902 shares to 5,284,543.

Dividends on common stock were increased to \$1.75 per share during 1956 compared to \$1.55 paid in the prior year. Of the 1956 income of \$18,250,000, more than \$9,500,000 was paid out as dividends, leaving about \$8,750,000 available to finance future growth.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

1. PRINCIPLES OF CONSOLIDATION The accompanying financial statements include the accounts of Chas. Pfizer & Co., Inc., parent, and its subsidiary companies, all of which are wholly owned. The accounts of those subsidiary companies having foreign operations are included for the fiscal year ended November 30, 1956. The net assets in foreign countries of foreign subsidiaries and foreign branches of a domestic subsidiary included as of November 30, 1956, amount to a total of \$34,208,837 as follows:

Current assets	\$36,566,015
Current liabilities	9,847,549
Net current assets	\$26,718,466
Plant, equipment and other assets	7,490,371
Net assets	\$34,208,837

Foreign assets and liabilities have been translated into United States dollars at approximate exchange rates prevailing at November 30, 1956, except net fixed assets which were translated at approximate rates at dates of acquisition. Income and expense accounts have been translated at approximate average month-end rates. Other transactions involving foreign exchange have been included in the statement of consolidated earnings at exchange rates in effect at the time the transactions were consummated and funds transferred. Transfer of funds from certain foreign countries is subject to exchange restrictions and release by exchange authorities.

The Company's equity in the net assets of its wholly owned domestic and foreign subsidiaries was \$30,187,478 in excess of the cost of its investments in these subsidiaries at December 31, 1956, and this amount has been included in consolidated earnings retained and employed in the business. Any dividends received by the parent company from subsidiary companies' current or prior years' earnings are subject to federal income taxes after deductible foreign income tax credits where applicable. The Company provides for this tax expense in the year in which the dividends are received.

2. TAXES The accompanying financial statements are subject to final determination of federal, state, local and foreign taxes. Federal income tax returns of the Company have been examined by representatives of the Treasury Department through the year 1950 and all assessments through that year have been provided for.

3. DEPRECIATION The statement of consolidated earnings includes provision for depreciation in the amounts of \$5,747,733 and \$5,484,446 for the years 1956 and 1955, respectively.

4. PATENTS, TRADEMARKS, ETC. During the year 1956 the Company purchased a patent at a cost of \$1,060,000 which is being amortized over its remaining life of approximately ten years.

5. PREFERRED STOCK The 3½% Cumulative Preferred Stock is redeemable at the option of the Company at prices ranging from \$102 to \$100 per share and the 4% Cumulative Second Preferred Stock at \$103.50 to \$101.50 per share. Each year the Company shall pay to the transfer agent (1) \$125,000 or the equivalent in reacquired 3½% Cumulative Preferred Stock for a sinking fund for the 3½% Cumulative Preferred Stock and (2) an amount in cash sufficient to redeem at a price per share equal to the par value thereof, plus all unpaid dividends, 4,500 shares of 4% Cumulative Second Preferred Stock. In lieu of all or any part of the cash payment, the Company may deliver reacquired 4% Cumulative Second Preferred Stock.

6. STOCK OPTIONS Pursuant to the Employee Stock Option Plan, approved by the shareholders on June 21, 1951, 250,000 shares of Common Stock were reserved for options to be granted at prices not less than 85% of the market price of the stock on the date options were granted. At December 31, 1956, the final date options could be granted, options for 149,383 shares had been ex-

ercised, options covering 91,421 shares exercisable to March 31, 1957, were outstanding and options for the remaining 9,196 shares had not been granted. All options were granted at a price of \$34.50 per share.

7. PAID-IN SURPLUS During 1956 Paid-In Surplus increased \$12,660,661 as follows:

Excess of the par value of 94,298 shares of 4% Second Preferred Stock over the par value of 224,141 shares of Common Stock to which the preferred stock was converted, less adjustments for fractional shares—\$9,189,743.

Excess of proceeds from sale of 100,500 shares of Common Stock under Employee Stock Option Plan over par value of shares sold—\$3,366,750.

Excess of par value over the cost of 16,453 shares of 3½% Preferred and 8,614 shares of 4% Second Preferred Stock reacquired—\$104,168.

8. DIVIDEND RESTRICTIONS So long as any shares of either class of preferred stock remain outstanding, no dividends may be paid on Common Stock and no Common Stock may be purchased or retired unless all dividend, purchase and sinking fund payments on such pre-

ferred stock have been provided for, and unless certain formula restrictions as to earnings retained and employed in the business are complied with. Under these restrictions, at December 31, 1956, the aggregate dividends and distributions on Common Stock and/or expenditures for purchases and retirements thereof shall not exceed \$51,508,041.

9. CONTINGENT LIABILITIES At December 31, 1956, the Company was guarantor for payment of indebtedness of certain foreign companies to banks in the maximum amount of \$1,471,870.

The Company is defendant in several lawsuits, including an action in which the Company was joined as a party defendant with Eli Lilly & Company. The claims in this case are for damages in the sum of \$20,000,000 (with treble damages under the anti-trust laws), based upon alleged wrongful acts to obstruct the issuance of a U. S. patent to the plaintiff.

In the opinion of the Company's counsel, the claims involved in these suits are without merit and will not result in any judgments which would be material in relation to the assets of the Company.

Chas. Pfizer & Co., Inc. and Subsidiary Companies

Net Assets

December 31

	1956	1955
Current assets:		
Cash	\$ 13,926,933	\$ 14,856,814
U. S. Government and municipal securities, at cost; quoted market value, \$3,110,200 at Dec. 31, 1956	3,093,525	115,500
Short term investments, at cost	4,953,500	2,950,125
Accounts receivable, less reserves	33,344,540	29,340,921
Inventories, at lower of average cost or market:		
Finished products and goods in process	44,513,564	42,070,093
Raw materials and supplies	8,154,364	7,524,551
Total current assets	\$107,986,426	\$ 96,858,004
Current liabilities:		
Notes payable to banks, foreign branches	\$ 4,270,515	\$ 4,607,341
Accounts payable	9,087,306	8,384,852
Accrued liabilities—Note 2:		
Federal taxes on income (less U.S. Treasury Tax Anticipation Bills: 1956—\$4,113,107; 1955—\$3,973,040)	10,524,297	11,183,864
Local, state, foreign and other federal taxes	3,646,746	3,168,392
Other accrued liabilities	7,867,131	6,129,445
Total current liabilities	\$ 35,395,995	\$ 33,473,894
Working capital	\$ 72,590,431	\$ 63,384,110
Investments and other assets:		
Security investments, foreign, at cost, quoted market value not available	\$ 2,218,158	\$ 1,599,365
Other investments, advances and deposits	1,067,436	789,873
Prepaid insurance, taxes and other deferred charges	3,860,265	3,342,818
Total investments and other assets	\$ 7,145,859	\$ 5,732,056
Fixed assets, at cost—Note 3:		
Buildings, machinery and equipment	\$ 74,930,348	\$ 71,232,121
Less reserves for depreciation	39,762,288	34,328,063
Land	\$ 35,168,060	\$ 36,904,058
Fixed assets, net	1,244,834	1,230,435
Patents, trade-marks, etc., less amortization—Note 4	\$ 36,412,894	\$ 38,134,493
Total	\$ 1,037,506	\$ 1
Deduct:		
Reserve for deferred compensation	\$ 1,836,053	\$ 1,687,674
Reserve for restoration of leased property	300,000	300,000
Total net assets	\$ 2,136,053	\$ 1,987,674
	\$115,050,637	\$105,262,986

Statement of Consolidated Financial Position

Shareholders' Equity

December 31

	1956	1955
Capital stock—Notes 5 and 6:		
Cumulative preferred stock, \$100 par value:		
Authorized 143,758 shares, issuable in series;		
Issued—initial series 3½%, 41,258 shares, December 31, 1956 and 42,508 shares, December 31, 1955	\$ 4,125,800	\$ 4,250,800
Cumulative second preferred stock, \$100 par value:		
Authorized 146,182 shares, issuable in series;		
Issued—initial series 4% convertible, 46,182 shares, December 31, 1956 and 147,270 shares, December 31, 1955	4,618,200	14,727,000
Common stock, \$1 par value:		
Authorized, 7,500,000 shares;		
Issued, 5,318,558 shares, December 31, 1956 and 4,993,917 shares, December 31, 1955	5,318,558	4,993,917
Paid-in surplus — Note 7	30,001,671	17,341,010
Earnings retained and employed in the business — per accompanying statement — Note 8	73,011,105	64,272,256
	<u>\$117,075,334</u>	<u>\$105,584,983</u>
Deduct reacquired stock held in treasury:		
Cumulative preferred stock, at par value, 15,475 shares, December 31, 1956 and 272 shares, December 31, 1955	\$ 1,547,500	\$ 27,200
Cumulative second preferred stock, at par value, 1,824 shares	182,400	—
Common stock, at cost, 34,015 shares	294,797	294,797
	<u>\$ 2,024,697</u>	<u>\$ 321,997</u>
Total shareholders' equity	<u>\$115,050,637</u>	<u>\$105,262,986</u>

See explanatory notes which are an integral part of this statement.

F. W. LAFRENTZ & CO.

CERTIFIED PUBLIC ACCOUNTANTS

EXECUTIVE OFFICES

NEW YORK CITY

100 BROADWAY - NEW YORK 5, N. Y.

TO THE SHAREHOLDERS
AND BOARD OF DIRECTORS
OF CHAS. PFIZER & CO., INC.:

We have examined the statement of consolidated financial position of Chas. Pfizer & Co., Inc., and subsidiary companies as of December 31, 1956, and the related statement of consolidated earnings and summary of earnings retained and employed in the business for the year then ended. Our examination was made in accordance with generally accepted auditing standards, and accordingly included such tests of the accounting records and such other auditing procedures as we considered necessary in the circumstances. Financial statements of foreign subsidiaries and of foreign branches of a domestic subsidiary included in the consolidated statements were not examined by us but we were furnished with reports of other accountants thereon.

In our opinion, based upon our examination and upon the reports of other accountants, the accompanying consolidated financial statements present fairly the financial position of Chas. Pfizer & Co., Inc., and subsidiary companies at December 31, 1956, and the results of their operations for the year then ended, in conformity with generally accepted accounting principles applied on a basis consistent with that of the preceding year.

New York, N. Y.
February 21, 1957

F. W. Lafrentz & Co.

The Chemist and the World's Food

(Continued from Page 7)

is some very personal form of protein—skin, hair, nails, etc. Invisible proteins are the key essentials of tissues, muscles, organs, of many vital blood elements and hormones, and of all enzymes, those astounding catalysts which spark every chemical process of life. Proteins are composed of simpler substances known as amino acids, of which there are approximately 22. Many amino acids can be synthesized in the body from other materials, but eight must be obtained partially or wholly from the diet. These eight are called the *essential* amino acids. If diet does not furnish these in adequate amounts, a very subtle and intricate form of hidden starvation ensues.

One of these eight is lysine. The body must obtain it from food. Protein of animal origin, such as meat, milk or eggs, is a good source of lysine. Cereals and vegetable proteins are poor in lysine or lack it altogether, yet cereals supply about 80 per cent of the calories and as much as 20 per cent of the protein consumed by man the world over. Lysine deficiency is doubtless most common among populations that subsist largely on cereal diets, such as rice. But cereal products are important, inexpensive carbohydrate mainstays of the diet in all countries, including the United States. White flour is an exceptionally poor source of lysine, even with the addition of yeast and milk proteins in bread-making.

TO FORTIFY BREAD

Many nutritionists believe that lysine fortification of white bread may be as desirable for public health as vitamin and mineral enrichment already in use. Conceivably, amino acid enrichment might convert cheap white bread into a fair nutritional equivalent of meat or fish.

Lack of a B vitamin causes pellagra, with specific symptoms easily recognized by a physician. Lack of a specific amino acid does not cause any clear-cut deficiency disease. Bodily chemical processes of inscrutable complexity may be subtly impaired, but symptoms tend to be vague and baffling: low resistance to disease, depleted energy, chronic ill health with no apparent organic basis. Consequently, amino acid imbalance is often hidden and usually unsuspected.

Lysine is a mere laboratory curiosity unless it can be produced in commercial quantities cheaply enough to be useful in enrichment of foods and pharmaceuticals. Production by synthetic methods gives a product which may contain 5 per cent or more of an inert form of lysine known as d-lysine. Last year, Pfizer chemists succeeded in producing commercial quantities of pure L-lysine, totally free of the nutritionally inactive d-form. The essential amino acid is produced by a unique, two-step fermentation process for which the Company was granted a patent in November.

Thus, along many fronts, chemists are attacking the problems of quantity and quality in providing food for an always hungry world. In the process they are learning a great deal about hitherto obscure nutritional needs. The red-headed ghost of Malthus, if not yet laid to rest, must at least be giving a few shudders of premonition.

Men and Molds

Artist's view of microscopic jungle
of molds man is learning to harness



The earthen pot in which this Egyptian of 2500 B.C.  brewed his mash was the ancestor of today's giant vats  in which life-saving

antibiotics like Pfizer's Sigmamycin are made by fermentation chemistry. Exactly

100 years ago, Pasteur  found that fermentation is caused by living organisms.

Among these organisms are molds.  Penicillin, made from a mold, was

discovered by Fleming  in 1928. A development 3,000 miles away — Pfizer's

mastery of the method of making citric acid  from molds — helped make

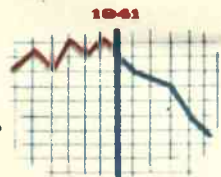
possible large-scale production of penicillin 16 years later, in time to save thousands

of Allied lives  in Normandy on D-day. Today, of the 17 antibiotics

in medical use, Pfizer mass-produces 12, by fermentation, as well as many hormones,

 vitamins and other chemicals (in some cases, by combining organic

synthesis and fermentation).

These compounds have drastically reduced mortality,  increased

food supplies  and given new chemical tools to industry. 

Fermentation chemistry makes materials essential to  plant sprays and

animal feeds,  cosmetics and candy,  rust removers and radiator

cleaners. It contributes to paints and plastics,  beverages 

and blueprints, and even  oil recovery.

Where is it all leading? It is too early  to tell. The future is

in the research  laboratory now... where drugs to extend our

lives,  and fuels to take us to the stars  are waiting for our children.

If you would like to read the whole fascinating story of fermentation, and to learn more about Pfizer, write for the free booklets, Our Smallest Servants and Men, Molds and Molecules.



Chas. Pfizer & Co., Inc.
11 Bartlett Street
Brooklyn 6, N. Y.

T.H. Industries. Pfizer

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RESEARCH and DIVERSIFICATION

*Prelude to the
expanding years ahead*

Remarks by

JOHN E. McKEEN

Chairman of the Board and President
Chas. Pfizer & Co., Inc.

and

GEN. J. LAWTON COLLINS (U.S.A. Ret.)

Vice Chairman of the Board
Pfizer International Subsidiaries

The following remarks by
Mr. McKeen were made
at a luncheon of the New
York Society of Security
Analysts, New York, N. Y.,
Thursday, June 22, 1961.
The text of General
Collins' remarks appears
on pages 9 to 14.

This is Pfizer's sixth appearance before this group. Eleven years ago, speaking before your society at a time when Pfizer's objectives were being substantially reshaped, we made this statement:

"Diversification has been adopted by the Board of Directors as a guiding principle of Pfizer operations, not only in sales, but in the establishment of plant and manufacturing facilities."

This commitment to a program of planned diversification, combined with the principle of decentralization of authority and responsibility, has been the major factor in Pfizer's growth. It has helped us make the transition from a domestic producer of a relatively few drugs and chemicals to an international organization turning out hundreds of different products for people in more than 100 countries.

Our time today is brief; so while we are tempted to recount some of the developments of the past decade, in the interest of time we will confine our remarks substantially to Pfizer today—and tomorrow. For those of you who want to catch up on your homework about Pfizer, the kit of literature at your table contains a good many facts and figures that may be of interest to you.

Let me simply say that Pfizer today is a far different company from what it was the first time we spoke here eleven years ago.

In 1949 our sales were less than 48 million dollars. Last year they totaled more than 269 million dollars.

Net earnings rose from 9.5 million dollars in 1949 to over 26 million dollars in 1960.

During this period, we invested nearly 90 million dollars in research and about 150 million dollars in capital expansion. Our field force increased from 25 salesmen in the United States,

to an organization of over 3,200 — 2,000 of them in countries abroad.

Our employees numbered about 2,700 in 1949; today they total over 18,000. And during that period, Pfizer share owners increased from 7,000 to almost 70,000.

It has been a challenging and productive decade, but we view it as merely a prelude to the expanding years ahead. Pfizer has been a growth company from one year to the next. We expect to continue to grow. Diversification — perhaps more than ever — will continue to be a way of life for us, with decentralization of authority and responsibility an indispensable principle of our operations. In a few moments General J. Lawton Collins will be speaking about our International Subsidiaries — a primary example of this concept at work at Pfizer.

At Pfizer, we seek diversification in three ways:

1. Research for new products and for new uses for our existing drugs and chemicals.
2. Acquisitions.
3. Building new Pfizer organizations and facilities throughout the world — geographical diversification.

Let us consider each of these in order.

First, research. To help you follow this discussion, a chart has been included in the kit you received at the start of this meeting. It is headed "Pfizer Research and Development" (beginning page 18). A glance at the major categories listed will give you some idea of the scope of Pfizer's current research.

Our research organization, in recent years, has grown vastly in size, in the range of its study, in personnel and in budget. In contrast to two modest-size research departments in our Brooklyn laboratories in 1949, our stateside research organization today totals nine separate departments, in addition to our cancer research unit at Maywood, N. J. We have some 1,200 scientists and technicians at work in Pfizer research laboratories throughout the world. Our major effort is now consolidated in new laboratories at Groton, Conn., with virology and vaccine development work at Terre Haute, pharmaceutical laboratories at Brooklyn, and research units in a number of countries overseas—England, India and Chile to name three of the more prominent.

Now what are these scientists attempting to

accomplish? This chart lists 16 major categories of research. In the middle column, these are broken down into 40 subdivisions. There are hundreds of further subdivisions within each of these areas. Today we can only briefly suggest some of the most interesting and potentially important developments in just a few of these areas.

Let us focus for a few moments on five of the categories listed on the chart: *virology*, which centers around the development of vaccines; *cardiovascular disorders*, which includes studies of the nation's biggest killer—heart disease; *cancer*, which follows closely behind heart trouble as a menace to human life; *human nutrition*; and *chemotherapy*, the area in which we seek better weapons against infectious diseases—either new and improved antibiotics, or entirely different classes of anti-infective compounds.

Consider *virology* first. This is category number 4 on the chart. A potentially important addition to our ethical product line in this area is the Sabin oral polio vaccine. Dr. Sabin has done a masterful scientific job in developing this vaccine. Our job in industry is to see that this achievement is carried through on the production line so that the vaccine can be made available in mass quantities. With scientific guidance provided by Dr. Sabin, the U.S. Public Health Service, and the Medical Research Council in England, Pfizer scientists have been able to solve some of the most difficult problems of large-scale tissue culture and virus propagation. As a result, our program is well advanced.

An extensive field trial with this vaccine was recently completed in Harrisburg, Pennsylvania by the Dauphin County Medical Society. Approximately 105,000 people turned out to take the third and final dose—about 15,000 more than volunteered for the first dose. This is a good omen because there is usually a drastic drop-off in participation when people must return for a series of doses. Field trials have also been conducted in several other cities. So we anticipate widespread use of this vaccine in community-wide programs.

In this same category of our chart, you may be aware that Pfizer has developed a measles vaccine. Tests in Buffalo and Syracuse were encouraging. We also have under development several other measles products.

The next area on the chart I would like to call attention to is category 7—*cardiovascular*

disorders. We have been devoting a good deal of research to these troublesome and often deadly diseases which strike the heart, blood vessels, and the circulatory system in general. For example, we have been trying to determine what causes hardening of the arteries and whether fat in the diet is related to atherosclerosis. We have also been studying the complex relationships among blood pressure, kidney failure and water retention.

One of the promising compounds coming out of these studies is a new diuretic and hypotensive drug called Renese. Our new drug application, which included some 1,000 clinical reports by 40 investigators, was cleared by the Food and Drug Administration last week, and we expect to make the drug available to physicians in the fall.

Renese is used to lower blood pressure and to treat edema—an often serious condition in which excess fluids accumulate in the body, such as occurs in kidney diseases and congestive heart failure. Renese has been studied by some of the foremost medical authorities in leading institutions in this and other countries.

As is customary, this broad clinical work was preceded by months of investigation by our laboratory chemists, and by more months of animal study by our pharmacologists. All of this is to evaluate the drug's safety and effectiveness before it is taken by any human.

Let us now turn to category 9 on the chart—*cancer research.* We have a substantial program underway as part of the Government-sponsored screening program. Our scientists are evaluating some 8,000 compounds a year for anti-tumor activity and a number of agents have been sent on to the clinics for study in humans. A few have shown activity in some patients and the results have been reported to the medical profession. But we can report no major developments. It takes years to evaluate accurately an anti-cancer agent in humans. The process of research is slow and painstaking, and progress is made by inches rather than in great forward leaps. But we are learning more and more about how cancer cells manage to thrive, and the more we learn the better are the chances of success in developing effective agents.

We are quite proud of the fact—and rightly so, I think—that one of Pfizer's research scientists developed a method of keeping cancer cells alive in plastic trays—a technique used in testing various experimental compounds side by

side with the more traditional method of growing tumors in laboratory animals. This is an important piece of fundamental research which gives science a new tool in attacking cancer.

So much for cancer research. Looking next at category 10—*human nutrition*—one of the worthwhile new developments is a unique theory recently published by a Pfizer scientist. This theory suggests that there is a very simple relationship between the amount of amino acids a man or animal eats, and the amount of such substances found in the bloodstream. Amino acids are the "building blocks" which form body protein. This theory indicates that by means of a relatively simple blood analysis, we could predict precisely the diet a man or animal should follow for the best growth and development.

Up until this time, the only method of improving diets has been a tedious, groping, trial and error approach—growing experimental animals on one diet, noting their progress, then changing the diet slightly and starting over on another series of animals. Scientists at the National Institutes of Health showed great interest in this concept. In collaboration with our scientists, they applied the theory in experimental animals and verified that a superior diet could indeed be achieved.

This idea, if it is borne out in further investigations, has some very promising potentials for human health and nutrition. It involves no product, but it is the kind of theoretical knowledge which, hopefully, will benefit the entire field of nutritional research and medical treatment.

Moving next down to category 13—*chemotherapy*—the range of study here is quite broad. Clinical work is just now getting underway with a new derivative of Terramycin. Generically, we refer to it as methylene-oxytetracycline. It is too early to predict how this antibiotic will prove out, although the data we have to date has been encouraging. Whatever the outcome of the clinical work, however, this compound is a significant achievement in medicinal chemistry. It is created by a combination of fermentation and synthesis; Terramycin is a product of controlled fermentation alone. This means we are beginning to have some success in solving the formidable scientific problems of substantially altering these highly complex molecules in the test tube—creating them by man-made synthetic steps. This is significant because except for

the one or two antibiotics produced through synthesis, we have so far depended largely on the fermentation molds. This new Terramycin derivative moves us one step further along the road toward new, more helpful, man-made antibiotics.

Much of this work, incidentally, had its beginnings in the early 1950's when a Pfizer research team succeeded in determining the structures of chlortetracycline and Terramycin, thus laying the foundation for succeeding developments in this field.

It is interesting to refer back to category 3 and find that *radio-chemistry* has played a role in the attempts to determine how these antibiotics work in the body against disease germs. This line of research was made possible by a Pfizer scientist who succeeded for the first time in tagging a broad-spectrum antibiotic with a radio-isotope. He reported his unique achievement at the Geneva Atoms-for-Peace conference of 1955. Here again we are dealing with fundamental research—with knowledge and technique. This is a tool of research; no product is involved. But it gives us an idea of the depth of research behind the development of these drugs.

In this same general area of research, our scientists have been attempting to create better forms of penicillin. Although penicillin was a momentous medical achievement, unfortunately it does have drawbacks in modern practice. It occasionally causes allergic reactions and is ineffective against some of the resistant germs that are occasionally encountered in hospitals. Ideally then, it would be a boon to medicine to have a new penicillin which could be administered orally rather than by injection and which would knock out these stubborn infections at the same time causing no allergy problems. Whether or not this ideal penicillin can be developed is difficult to say, but heartening progress has been made in the difficult technology of creating new forms of the drug.

The great problem in this work was to isolate the nucleus of the penicillin molecule, known as 6-amino penicillanic acid—or 6 APA for short. In our own laboratories Pfizer scientists developed a unique method of neatly severing the side chain off the penicillin molecule through a fermentation process using micro-organisms. Then, with the basic skeleton available, our scientists devised methods for attaching new side chains to the nucleus and as a result, more than

2,500 man-made penicillins have been created in our laboratories. So far, only one of these Pfizer-developed compounds—Maxipen—has shown enough superiority over penicillin G to be placed on the market.

The discovery or creating of new and unique compounds for medicine, industry, and agriculture, is one of the major activities of our research organization. Another major part of research is devoted to expanding the uses for existing Pfizer products—either through new formulations, or through research in new fields where they might be applied to good advantage. In either case, considerable scientific study is necessary.

Under category 16, you will note that we are constantly seeking new uses for our various fine chemicals. At this time, for instance, we have an active program under way to expand the market for itaconic acid. This follows our acquisition of a one-third interest in LIRC (Laboratori Italiani Ricerca Chimica, S.p.A.) of Milan, Italy—an organization formed to develop new uses for this versatile chemical. As a result of this program, itaconic acid is being used now to make drinking tumblers, lampshades, auto reflectors and other plastics items.

We have recently developed other promising new chemical applications, including the use of citric acid as a superior cleaning agent in maintaining steam boilers in power plants.

So much for research and development, except to note the significant fact that Pfizer researchers have contributed 835 papers to scientific literature over the past eight years. Let's turn now to acquisitions.

As might be expected in an organization such as ours, most of our diversification and growth has come from within. It has been generated by the talents, efforts, and enthusiasm of Pfizer people throughout the world. The development of life-saving drugs such as Terramycin, tetracycline and Diabinese has been the result of their teamwork. Our entry into the ethical pharmaceutical field in 1950 was accomplished by building our own marketing organization, Pfizer Laboratories, from the ground up. We are confident that this tradition of "growth from within" will continue.

Through the years, however, Pfizer has been not unmindful of the importance of finding new outlets for the talents and energies of its people. Thus we are alert to "external" opportunities,

in terms of purchasing existing companies or products. Past acquisitions have given us a start in such fields as packaged vitamins and plasticizers.

Within the past two weeks we have signed an agreement for an acquisition which will further diversify our product line and open new potentials for growth. The company involved is Paul-Lewis Laboratories, Inc. This acquisition is based on an exchange of that company's stock for approximately 60,000 shares of Pfizer common stock.

Paul-Lewis will be operated as a subsidiary of Pfizer. This company specializes in the research, production and technology of enzymes—one of the most fascinating and still largely unpenetrated frontiers of science. These substances are fundamental to life. They control the body's chemistry and they are involved in fermentation processes. They are produced by living cells, in the highest to the lowest forms of life, and are sometimes called "living catalysts." Among the most familiar are the digestive enzymes which transform the food we eat. Each controls a specific chemical reaction, speeding the breakdown of substances, but not becoming part of the products it transforms.

Paul-Lewis manufactures enzyme products for the dairy and brewing industries, and several specialty enzymes for the pharmaceutical, food and paper industries. One of the principal Paul-Lewis products is rennet extract, used in making cheese.

We are convinced that research efforts of Pfizer scientists and those of Paul-Lewis will be mutually advantageous, and that Pfizer's fermentation experience will be especially helpful in the development of a broad range of enzyme products.

Through such acquisitions, and with our research teams engaged in a world-wide scientific exploration, new areas of diversification are opening to Pfizer—new fields to develop in the months and years to come.

A third and very important aspect of Pfizer diversification has been its geographic expansion—the construction of plants, facilities, and marketing organizations to make Pfizer products available throughout the world.

Many of you will recall that Mr. John J. Powers, Jr., who heads our international operations, joined me the last time we spoke here in 1959. Mr. Powers is currently abroad. With me today is Gen. J. Lawton Collins, a member of

our Board of Directors and vice chairman of our International Subsidiaries. He is known to most of you, I am sure, as a soldier who led our combat troops in some of the most crucial battles of World War II, and as diplomat in the post-war years. As an officer of our International Subsidiaries, he has taken part in the successful planning and administration of Pfizer's expansion abroad.

* * *

Remarks by General Collins

During the eleven years of their existence, the International Subsidiaries of Chas. Pfizer & Co., Inc., have expanded their operations abroad so that today we have our own organizations in 47 countries with plants built or building in 24 of these countries, and distributors in about 60 others, making a total of over 100 countries in which Pfizer products are sold. These countries, encompassing practically the entire Free World, provide a market of approximately two billion people. Hence, it is not surprising that last year Pfizer International's sales constituted about 48 per cent of the total business of the parent company.

Such progress could have been achieved only through good organization and sound business practices, directed by men of vision and judgment. I can say this without embarrassment since I have been with Pfizer for less than five years.

Pfizer International has always followed the principle of establishing basic policies in New York but decentralizing both authority and responsibility for day-to-day operations to our seven area or regional managers and 47 country managers. These managers are guided in their operations by a procedures manual and an accounting manual and they are required to submit annual budgets to New York which, after review and approval, must be lived up to.

However, it is essential that the President of Pfizer International, Mr. John J. Powers, Jr., and his top assistants be able to get out in the field with these area and country managers to see first hand, and to evaluate, the complex problems and opportunities in a business that spreads round the world.

To make this possible Mr. Powers has recently created two new vice presidencies in New York. Mr. Richard C. Fenton, our former area manager in the United Kingdom, Northern Europe and Africa, now has New York respon-

sibility for operations in the U. K., Europe, the Mediterranean Area, the Middle East and Africa. Mr. William Dechert, formerly area manager for Southern Latin America, now supervises operations in Central and South America and the Far East. Mr. Powers is thus free to concentrate on broad problems of financial planning and control, and to visit overseas managers as occasion demands. In fact, one or the other of the operational vice presidents is likewise available for field trips, and I have also assisted Mr. Powers in visits and negotiations overseas.

Such a flexible organization is prepared to meet the many varied factors that affect our business. I doubt that any new ones could be turned up that we have not already encountered. For example, increased Government interest in licensing of pharmaceutical plants and products; in registration of new drugs; in Government operation of health and hospital plans; currency controls; import restrictions, etc., are taken in stride by our experienced area and country managers and top management in New York.

We are troubled at times by recurring infringements of our patents in various countries by Italian producers of tetracycline. As you know, Italy is the only major country in the Free World that does not have either product or process pharmaceutical patents. We, and other American companies, have had to contend with Italian infringement and sale in several countries outside Italy of drugs invented and patented by U.S. manufacturers. Our efforts to counter this problem have been complicated by the fact that the Military Medical Supply Agency of the U.S. Department of Defense has likewise infringed our patents by purchasing and using in this country tetracycline from low-cost Italian producers who employ cheap labor, pay lower taxes and have little or no research expense, since they are thus encouraged by a United States Government agency to use the results of American research. Pfizer's world-renowned quality and service has enabled us generally to meet this Italian challenge overseas.

We have had to meet challenges also from Russia. Shortly after we purchased Dumex, a pharmaceutical offshoot of the East Asiatic Trading Corporation in India, the Russians offered India a long-term loan equivalent to 20 million dollars in foreign currency, to be supplemented by 40 million dollars in Indian

rupees, for the construction of an integrated pharmaceutical manufacturing industry to include five major plants. These plants were to be owned and operated by the Government in direct competition with private industry. The Indian Government had been having some difficulties with one of its narrow-spectrum antibiotic plants. We figured that if we could get approval of a basic fermentation plant, and get it quickly into operation, we might be able to forestall implementation of the Russian offer. It took a year of negotiations to secure the license, but one year later — this April — Mr. Powers formally opened our new plant at Chandigarh, the capital of the Punjab. It is on stream and results to date have been highly satisfactory. Communist activity in Tibet and southeast Asia probably have contributed to delay any work on the Russian project. Meanwhile we have continued to press on with our plans for India, including taking over our own distribution there, and have been rewarded with sales thus far this year that are 60 per cent ahead of last year.

Another major factor that affects Pfizer's international business is the matter of taxes. These vary from country to country and require most careful attention. Unlike the United States, income taxes do not constitute the major source of revenue in most foreign countries. Instead, almost every stage in the operations of a business corporation has its own tax. There are customs and landing taxes; transfer taxes which are applied each time ownership of goods changes hands; substantial payroll and social security taxes; and finally income taxes. Needless to say, the sum total of these taxes far exceeds what are labelled "income taxes." No credit for these taxes, other than income taxes, is allowed by the U.S. when profits come home as dividends.

Thus it is inherently illogical to compare income taxes paid by domestic producers in the United States with "income taxes" paid abroad. It is equally fatuous to impute, as had been done in the Treasury's recent tax recommendations to the Congress, that American manufacturers are going abroad in order to avoid U.S. taxes. This and other misconceptions about American direct investments abroad are thoroughly analyzed in a study prepared by Mr. John J. Powers, Jr., a copy of which you will find in your information kit. It is worthy of your careful reading.

Aside from our moral responsibility to make our life-saving drugs and scientific advances available to people everywhere, we have been forced by the economic facts of life to build our own organizations and plants in many countries abroad. The threat of new external trade barriers raised by the European Common Market, the European Free Trade Area, and comparable associations being created in Latin America and other parts of the world, make it essential for us to have plants in all such areas. Many of the newly-independent countries have placed restrictions on imports of manufactured goods and have offered significant local tax and other advantages to locally-manufactured goods over those manufactured outside national boundaries. By building pharmaceutical manufacturing plants in such countries, we can still import bulk materials, produced in our domestic plants, for formulation and packaging into dosage forms abroad. If we did not have such plants, the Russians, Germans, Italians, or Japanese most assuredly would move in and take a large share of our foreign business with resultant loss to United States domestic production, taxes and jobs.

During the past year we have opened a plant of this kind in Greece, are building similar plants in Venezuela, Peru, and Nigeria, and have acquired a chemical plant in Australia. The plant in Nigeria represents our first manufacturing venture in Western Africa, though we have been selling throughout Africa for several years. Mr. Fenton and I spent a week in Nigeria last fall, driving over 600 miles on good roads and visiting each of the three regional states that comprise this stable country, the largest in Africa with a population of almost 40,000,000. We are confident that our free-enterprise type of operation in Nigeria will assist this vigorous new nation in its determination to develop its economy and to remain free of the shackles of Communism.

Where it is essential in order to hold our markets, and is economically sound, we may find it necessary to build basic fermentation plants in addition to those we are now operating in such countries as England, France, Japan and those completed last year in the Argentine and Brazil. As I said earlier, Mr. Powers recently dedicated our new fermentation plant in India. Construction is just getting underway on a similar project in Spain where conditions have made it desirable to do basic fermentation.

Pfizer International's activities abroad have not been limited to expansion of our capacity to produce and sell ethical drugs. We have embarked in the proprietary field in the United Kingdom, Germany, Pakistan, Ceylon and India — I might add with the usual difficulties to overcome in this rough competitive business. Daxaid, an antacid preparation, and Cleer, a nasal decongestant, are beginning to move in England; an analgesic, Ring tablets, is being marketed in Germany; and we have several other proprietaries in test markets. Our line of baby foods, inherited from Dumex, has always sold well in India. A high protein concentrate, called Protinex, made in India from peanuts, has considerable potential.

The chemical side of our business is also being pushed, though the competition, particularly in Europe, is keen. As sophisticated American-type prepared foods and soft drinks spread around the globe, there will be increased demands for citric, and new uses for this versatile acid and its derivatives are constantly being found, as, for example, in enamelling and boiler cleaning. Pfizer recently purchased a one-third interest in Laboratori Italiani Ricerca Chimica, in Italy, which will expand our business in itaconic acid and tie in with other Pfizer products of interest in the plastics industry.

One of the most promising areas for diversification and expansion is that of agriculture and animal health. Our Terramycin veterinary products have done well abroad and there is a tremendous potential market for such products in the developing areas of Asia and Africa. We have just acquired the Biologicals Division of Bayer Products group in Britain, with an extensive list of veterinary biologicals, dairy hygiene products, sheep dips, coccidiostats, etc. which will materially broaden our present line.

And last, but by no means least, Pfizer International, along with the parent company, is vigorously pushing that fundamental source of diversification and new products: scientific research. Of course, the bulk of this is being done in the United States. But we have a highly competent research group in England, which has been particularly active in the field of virology. While our Terre Haute virologists were concentrating on flu and measles vaccines, Pfizer Limited's scientists at Sandwich, England, were working on the Sabin polio vaccine and we confidently expect that Pfizer will be the first company in the Free World to market a thoroughly-

tested, U.S. Government approved, oral polio vaccine.

We are confident also that our experience in the less-developed areas of the world, most of which are located in the tropical, or semi-tropical zones, will afford opportunities to Pfizer International to study and develop drugs to combat diseases, both in humans and animals, peculiar to such areas.

The above covers the highlights of current and recent developments in Pfizer International. The first decade of our overseas expansion was completed last year. The end of this period was marked not only by sales last year abroad in excess of 130 million dollars but by the first substantial return of dividends to Chas. Pfizer & Co., Inc., totalling over 4 million dollars. Already this year we have paid dividends of 6 million dollars and we expect that new programs already underway will make it possible to bring increasing returns to our parent company.

Great new forces are at work in the world to improve health and general standards of living. Pfizer International plans actively to participate in these developments, to the benefit of Pfizer's share owners and employees, to our nation as a whole, and to the people of the countries which we serve.

* * *

Continuation of Remarks by Mr. McKeen

Now let us turn to the future of Pfizer and the industry of which we are a part. First, a word about a current legislative proposal which, if enacted, would have a profound impact upon the operations of the pharmaceutical industry. We refer, of course, to the Kefauver-Celler bill.

Let me say at the outset that Pfizer is not opposed to change — we favor improvements in laws regulating our industry when they are clearly in the public interest, even though they alter established procedures.

For instance, we are not opposed to the principle of enlarging FDA's factory inspection authority, although we may have objections to details connected with the way the bill would accomplish this. We would even favor a mandatory requirement of periodic inspection, not now included in the bill.

However, we have basic objections to several

provisions of the bill and in particular to its requirement of compulsory licensing of drug patents three years after their effective date.

This provision would, at the very least, seriously retard industry's search for new and improved pharmaceuticals. On the surface, the provision might appear to create more competition. But its effect over the long pull would be to impede seriously the entry of new companies into the field as well as the growth of established companies, particularly smaller firms.

Pfizer provides an excellent example of what I am talking about. Prior to 1950, Pfizer was a comparatively small manufacturer of chemicals for sale principally to food and drug companies. The company had attempted to enter the ethical drug field with its penicillin and streptomycin products, but was unable to make any substantial headway until the discovery of Terramycin. We obtained a patent on this product, and decided to market it in dosage form under our own label. Our success in doing so was the basis for our subsequent expansion in the ethical drug field. We marketed hormones, vitamins, and a motion sickness remedy in 1953, and after that new steroids, tranquilizers, newer antibiotics, an oral antidiabetic product, a psychic energizer, new animal feed supplements and animal health remedies; and in the process we entered new markets in the United States and throughout the world. Thus, our exclusive use of the patent we obtained on Terramycin brought new competition into the ethical drug industry, both here and abroad, not only in the field of antibiotics, but also in many other product categories as well.

Turning now to the first half of 1961, we estimate that sales for the period will be about 4 per cent ahead of last year. Earnings should run about 10 per cent above those reported for the first six months of 1960.

We have received two dividend payments from our International Subsidiaries this year, amounting to 6 million dollars. This compares with slightly over 4 million dollars paid during the year in 1960 by our International Subsidiaries. Incidentally, it should be noted that such transfer of funds in the form of dividends does not give rise to increased consolidated earnings, since earnings from which such dividends are paid are recognized in the company's consolidated statement.

It has been suggested, indeed, that as more foreign earnings are brought back to the United States the additional taxation these earnings are subject to may tend to level off Pfizer's growth trend and after-tax net. Let me say this: we have no plans whatsoever to decelerate our expansion and diversification programs, either here or abroad. On the contrary, we expect to move ahead as vigorously as we have in the past.

We are confident that through consolidation of our gains and constant improvement of our operations we can continue to expand and diversify both geographically and in fields of interest. At the same time, our pre-tax earnings should rise in sufficient amount to both offset the increase in what might be called our "consolidated tax rate" and enable us to continue our eight-year unbroken record of post-tax profit increases.

Our ability to do so is reflected in our 1961 first quarter results which, as you know, showed a 5 per cent increase in net profit as well as sales. This increase in post-tax net was achieved in the face of a 12-point increase in our "consolidated tax rate" from 29 per cent in 1959, a year in which we did not receive dividends from our International Subsidiaries, to 41 per cent in the first quarter this year. This tax rate rise resulted mainly from our repatriation of dividends. Our "consolidated tax rate" for the six month period continues to run about 40 per cent.

We are optimistic about the balance of the year, although we are faced with continued low prices in penicillin, streptomycin and bulk vitamins, and vigorous competition which has affected our citric acid sales. We believe, however, that these factors will be offset by increased volume in some of our other product lines here and abroad and by added sales from recently-introduced products.

Niamid, Daricon, Vistaril, Diabinese, Terramycin, Tao, Antivert and Bonine are being prescribed in substantial volume throughout the world. They are making a significant contribution to our overall sales.

Some of the recent developments that have increased the usefulness of Pfizer drug products are:

A new intramuscular form of Bonadoxin for controlling nausea and vomiting in pregnancy.

A new flavored syrup form of Antivert, used in treating vertigo.

A new preconstituted liquid formulation of the antibiotic Tao, which is convenient because it does not have to be mixed with water.

In the animal health field, recent innovations include Taomyxin, introduced last month to promote growth and feed efficiency in swine, and Terramycin Pet Tablets, a convenient form of Terramycin with vitamins just going on the market for treating infections when the animal also needs nutritional support.

A significant development in fine chemicals is a packaging and production improvement which has resulted in a new free-flowing form of improved anhydrous citric acid. This product is packed in the specially designed Pfizer Flo-Rite Pak which provides increased resistance to caking. We expect this development to be an important factor in meeting competition in the citric acid market.

Along with the development of new products, we continue to look for ways to cut our operating costs and improve efficiency throughout the organization. We are making increased use of automated chemical processing equipment, electronic computers, and high speed calculators, not only in our office and plant operations, but in our quality control laboratories and research operations as well.

This year, our capital spending program will total about 20 million dollars. A part of this program calls for construction of a new addition at our Brooklyn packaging plant. When construction is finished, we will have a completely mechanized packaging plant—one of the finest of its kind in the industry.

This is an example of the kind of improvements we are making throughout our organization to keep our operations efficient and productive throughout the decade ahead.

Gentlemen, we have no doubt that it will be a decade of further growth and expansion for Pfizer. We are confident that the philosophy of diversification buttressed by decentralization of authority and responsibility will serve us as well in the years to come as it has during the past 10 years of growth.

Ten years ago Pfizer share owners could not have imagined that the company would be selling raw materials for plastics and petrochemicals, or even vaccines, and a full line of medicinal chemicals. Yet, these products are marketed today by the company. Ten years from now our product line will undoubtedly be further diversified and the Pfizer label will be even more commonplace in the home and on the farm, as well as in Pfizer's more traditional areas of the physician's office and of industry.

PFIZER RESEARCH AND DEVELOPMENT

**RECENT
SCIENTIFIC PAPERS
(1953-1961)**

1. INDUSTRIAL MICROBIOLOGY & ENZYMOLOGY

FERMENTATION CHEMICALS

Pioneered development of processes for citric, oxalic, gluconic and itaconic acids. Laid groundwork for future developments in biochemical engineering. Successfully produced amino acids by large scale fermentation. Basic studies in the production of algae. Search for new fermentation chemicals has been recently intensified.

14

ANTIBIOTICS

Pioneered adaptation of deep tank fermentation principles to the mass production of penicillin. Refined and extended biochemical engineering techniques for ultra-purity and sterility on giant scale.

12

STERIODS

Developed methods for microbiological transformation of steroid intermediates. Knowledge on transformation used as research tool to convert a wide variety of chemical and biological substances to compounds of possible interest to science and medicine.

11

The acquisition of the Paul-Lewis Laboratories ideally complements Pfizer's microbiological know-how. New research ventures, utilizing Paul-Lewis knowledge of enzymology in conjunction with Pfizer's knowledge of fermentation technology, are being undertaken.

2. MYCOLOGY

SCREENING

Developed and systematized procedures for rapidly screening thousands of micro-organism species to speed up the search for drugs and chemicals useful to man, animals and plants.

4

GENETICS and PROPAGATION

Adapted the principles of microbial genetics to facilitate the evolution of new species mutants.

15

CULTURE LIBRARY

Developed one of the largest culture collections in the world, particularly the actinomycetes. Cultures are exchanged with the leading institutions of higher learning in support of basic research. Characterization and identification of micro-organisms. Hospital Advisory Service to assist physicians with problem infections in his practice.

6

3. RADIO-BIOCHEMISTRY

IMMUNOLOGY

Extensive investigations of the reticulo-endothelial system undertaken, utilizing radioactive substances. The use of lipopolysaccharides to enhance immunity to disease being studied.

8

4. VIROLOGY

5. METABOLISM

DRUG METABOLISM

Produced first radioactive broad-spectrum antibiotic used in study of absorption, distribution, fate and mechanism of action. Similar research carried out with other drugs.

20

CANCER

Radioactive drugs utilized as a research tool in basic cancer research and for their possible therapeutic effects, particularly in those areas of the body where specific drugs tend to accumulate.

VACCINES

Sabin oral polio vaccine in development. New measles vaccines under development. Basic studies underway to improve the potency of existing vaccines by use of adjuvants and by concentration methods. Multiple vaccine formulations under study. Basic studies on vaccine toxicities and on virus vaccine structures.

21

TISSUE CULTURE

Fundamental research underway on adaptation of deep tank fermentation techniques to the production of various animal tissue cultures. Improved methods of surface and egg tissue culture production.

3

ARTHRITIS and INFLAMMATION

Extensive effort in chemistry and pharmacology has been allocated to the synthesis and testing of a large number of steroidal and non-steroidal anti-inflammatory agents. In recent months, several important scientific leads have been uncovered which may yield medicinals superior to those now available to the physician.

33

DIABETES

The chemistry of the sulfonylureas has been thoroughly investigated and correlations between structural configurations and hypoglycemic activity drawn. In the course of this research, Diabinese was discovered. Research on the diabetes problem continues on both the basic and applied levels. A new structural type is presently under investigation.

19

APPETITE

The chemistry and basic pharmacology of appetite depression is undergoing thorough research. The object of this work is a drug which effectively suppresses the appetite without creating undesirable central nervous system side effects.

9

6. BOTANY

HERBOLOGY

Investigation of herbs and plants mentioned in folklore or in use by aboriginal medicine men in an attempt to isolate, purify and reproduce the active principles. Higher plants are the source of many valuable drugs or drug intermediates currently in use. Examples: alkaloids, narcotics, steroids, etc.

14

CELL PROPAGATION

Discovered a method for the mass propagation of higher plant cells using industrial microbiological techniques. Cells from a number of commercially useful plants are amenable to this mode of reproduction.

Examples: Mexican yam—source of sapogenins, corticosteroid intermediates.

10

7. CARDIOVASCULAR DISORDERS

EDEMA

Basic chemical and pharmacological research has uncovered a number of promising diuretic compounds. One agent has been introduced to the medical profession and several others are in various stages of clinical evaluation.

Renese, new, potent diuretic-anti-hypertensive cleared by FDA.

17

ANGINA PECTORIS

Basic medical studies being conducted on anginal syndrome. Niamid found to afford symptomatic relief.

ATHEROSCLEROSIS

Basic pharmacological investigation of causes and mechanisms involved in arteriosclerosis. Of particular interest is the area of atherosclerosis and its connection with fat metabolism.

HYPERTENSION

Basic chemical and pharmacological research conducted in hypertension and in a search for useful drugs. A number of compounds have been evaluated at the clinical level.

31

8. MENTAL HEALTH

ATARACTICS

Basic chemical and pharmacological research continues in the search for effective tranquilizers having minimal side effects. Several interesting CNS compounds are in the clinical stage.

22

ANTI-DEPRESSANTS

Research on the chemistry and the pharmacology of the substituted hydrazines led to the discovery of Niamid's anti-depressant properties. Animal studies confirmed by clinical findings, indicate lack of undesirable hypotensive side effects.

23

9. CANCER

SCREENING

Participating in Government-sponsored chemotherapeutic screening program. Approximately 7- to 8,000 agents evaluated each year. Several active compounds now in clinics.

16

BASIC STUDIES

Developed tissue culture technique. Heterologous (human tumor) screen in operation. Basic study of cancer cell propagation using time-lapse photography.

6

10. HUMAN NUTRITION

AMINO ACIDS

Pioneers in the adaptation of biochemical engineering techniques to the mass production of amino acids.

Basic studies in the role of amino acids in human nutrition supported by company. Serum profile research has attracted much attention with NIH collaboration.

15

VITAMINS

Developed techniques for the mass production of the vitamins. Basic studies on absorption undertaken.

16

HEALING

Basic medical research undertaken to evaluate N-acetylglucosamine's role in the healing of wounds and the restoration of nitrogen balance.

FOOD and BEVERAGES

Extensive applied research carried on over several generations on the use of fine organic and inorganic chemicals in the processing and fortification of food products. Pfizer compounds are used in freezing, canning, preserving, enriching, emulsifying, baking, milling, dairy processes and products, candy, carbonated beverages, beer, ale, wine, etc., etc.

48

11. GASTRO- INTESTINAL DISORDERS

ANTISPASMODICS

Applied research conducted to develop products to aid in the healing of ulcers. Search for a drug which cut down gastric secretion and motility was successful. (Daricon).

5

ANTI-EMETICS

Applied research undertaken to develop products to combat nausea and vomiting due to motion, pregnancy, anesthetics, vertigo.

12. PAIN SYNDROMES

ANALGESIA

Basic programs undertaken to find drugs superior to those now in use. Extensive medical studies evaluating Niamid's role in the relief of pain in cancer, heart disease, child-birth, menstruation, etc. underway.

1

CORYZA

Applied research for products useful in the treatment of the common cold symptoms, such as ocular, otic and nasal congestion. Basic pharmacological research on respiration.

3

15. AGRICULTURE and VETERINARY MEDICINE

NUTRITION

A pioneer in the use of broad-spectrum antibiotics as animal feed supplements. Extensive research carried out on unidentified growth factors on both the basic and applied levels.

80

ANIMAL HEALTH

Extensive applied research in the diseases affecting chickens, turkeys, cattle, sheep, swine, canine, mink. Basic studies in anti-infective applications. Conducted basic research on animal health, care, handling and behavior. Poultry Diagnostic Laboratories established as service to agriculture.

45

PLANT HEALTH

Numerous compounds screened and evaluated for their ability to combat blights affecting important crop and decorative plants. Program designed to evaluate gibberelins and growth stimulants.

22

APPLIED RESEARCH

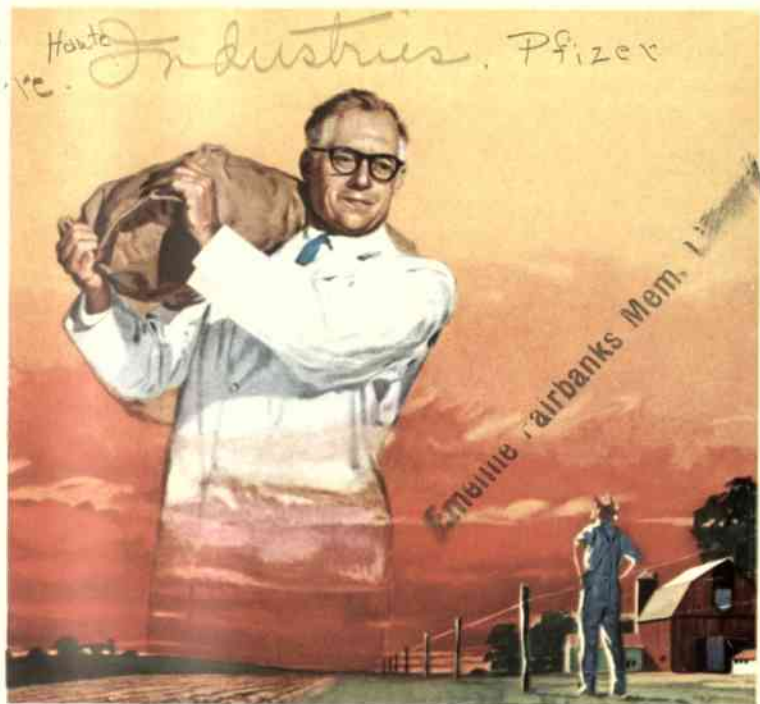
Extensive evaluation of the application and use of company products in the leather, textile, blueprint, plastics, petroleum, plaster, cement, metal plating and polishing, surface coating and cosmetics industries.

64

Products(in bulk) are supplied also to the pharmaceutical industry.

Basic chemicals are focal points for diversification through acquisition and research. Research has been intensified in this area. LIRC venture affords new end use opportunities for itaconic acid and its derivatives.

16. INDUSTRY



Report from Pfizer...



After Five... For the past five years, the light in the laboratory window has been a common sight at Terre Haute. While the Indiana countryside sleeps, microbes without time clocks thread their way through these or nutritional experiments, unfolding their secrets to the probing scientists. For the scientists, these past five years have been a round-the-clock search for new techniques of defeating disease or improving feed efficiency—a search for new, practical ways to help the feed industry bring science to the farm in a feed bag.



This year marks the 5th anniversary of Pfizer's Agricultural Research and Development Center at Terre Haute, Indiana. In that time, mountains of research data have been developed on nutritional ingredients ranging from vitamins to Vigofac... on disease-fighting techniques ranging from pig starters to high level feeds—all designed to contribute to the feed industry's efforts to improve feed and feeding methods.

From a battery in Brooklyn . *this is the story of* **FIVE**



In the past five years, improvements in feed—antibiotics, hormones, vitamins, growth stimulants and others—have done outstanding jobs of increasing the production of meat, milk and eggs from every ton of feed. At the same time, feed sales have increased.

But these five years have been merely a forecast for the future. The biggest opportunity for the feed industry and agriculture lies in still further expansion through improved feed and feeding methods.

To aid in this job, the research activity at Terre Haute has had but one goal since its inception—find new ways Pfizer can be of service to the feed industry. And to this end, the results of research here have had a single yardstick—the new technique must be practical.

Any new product, method or technique must be safe for any farmer to use. It must measure up to the exacting conditions of a feed mill. It must pay its own way. It must help the farmer produce more meat, milk or eggs... in less time... at less cost... and with greater assurances of results than even the scientists themselves—until recently—ever dreamed possible.

In the past five years, the scientists at Terre Haute have made many contributions towards this common goal. And the next five years promise even greater results from the test tubes and experiments of these hard-working, practical scientists in shirt sleeves.





700 acres in Indiana,

FRUITFUL YEARS

From the start of Pfizer's agricultural research, Dr. Herbert G. Luther and his research philosophy have guided the Center to its present position of a world leader in animal research.

To make this center a research arm of the feed industry, we fenced in our animals—not our research staff.



We approach a problem from all sides. Veterinarians, bacteriologists, nutritionists and others, all work together to find the answers.



Antibiotics for ruminants are a good example. Our bacteriologists proved it was safe in the laboratory and the nutritionists proved it in the field.



New developments come so fast that evaluation procedures must be fast as well as thorough and accurate.



For example, when the feed industry was plagued by a hemorrhagic disease problem with chickens, we did thousands of heart punctures and blood-clotting determinations.



In this case it was important to have the answers in a hurry. And in six weeks we supplied the feed industry a complete report.



And with a 1,000-animal trial, we can collect data in 3½ hours, put it on the IBM machine and get the answers the same day.



Our work has two goals. It must be scientifically sound and economically feasible. Ultimately, our research must contribute to a better, more efficient agriculture.



WHERE RESEARCH IS A 2-WAY STREET...



The projects at the center, although many, are but one part of the Terre Haute story, for research here is a two-way street drawing heavily upon the contributions of extension services, the USDA, and the many fine research facilities of the feed industry. It is this pooling of knowledge with universities and industry . . . the interaction of many minds . . . which has given the work of the Pfizer research center real meaning, for research has no value until someone puts it to work.

The crystal ball that shows the future

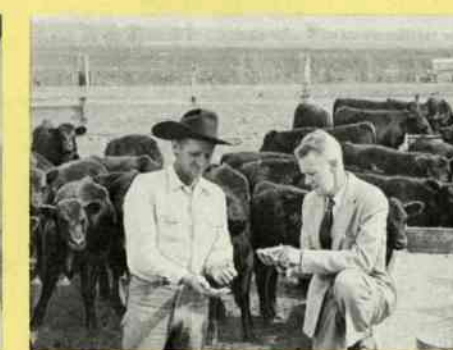
Throughout the world, scientists in basic research are unlocking the secrets of life, growth, health. Many of these new discoveries hold tremendous, but still unknown potential for increasing farm productiveness and profits. This display, at the Pfizer Agricultural Research Center shows how cooperative research, on many levels, helps to shorten the time it takes to bring the new benefits of science to the farm in a feed bag.



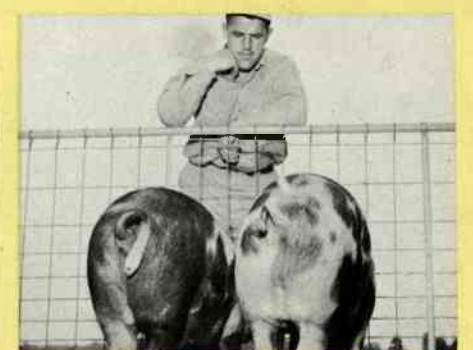
Hundreds of feed industry specialists and animal health and nutrition experts visit Terre Haute every year, exchanging research findings.



Dr. Roger P. Link, a visiting professor on leave from Illinois, exploring digestive processes through porthole in the belly of an experimental baby pig.



A Pfizer extension veterinarian testing a new antibiotic and feeding technique with beef calves in a Wyoming feedlot demonstration.



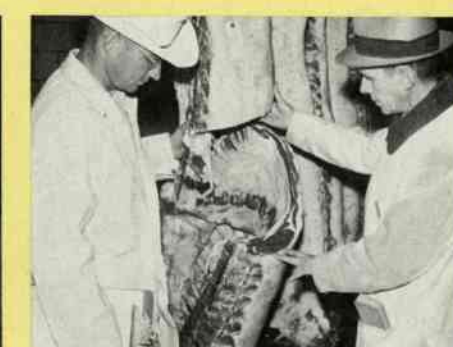
An Iowa farmer in a cooperative feeding trial proving in practice a theory that will help him raise pigs faster, cheaper, healthier.



A feed technologist measuring one of over 230 feed ingredients at Pfizer's feed-mixing room to prepare a new, experimental ration.



A graduate student, one of 15 employed at Terre Haute for the summer, drawing a blood sample from a chicken in the study of hemorrhagic disease.

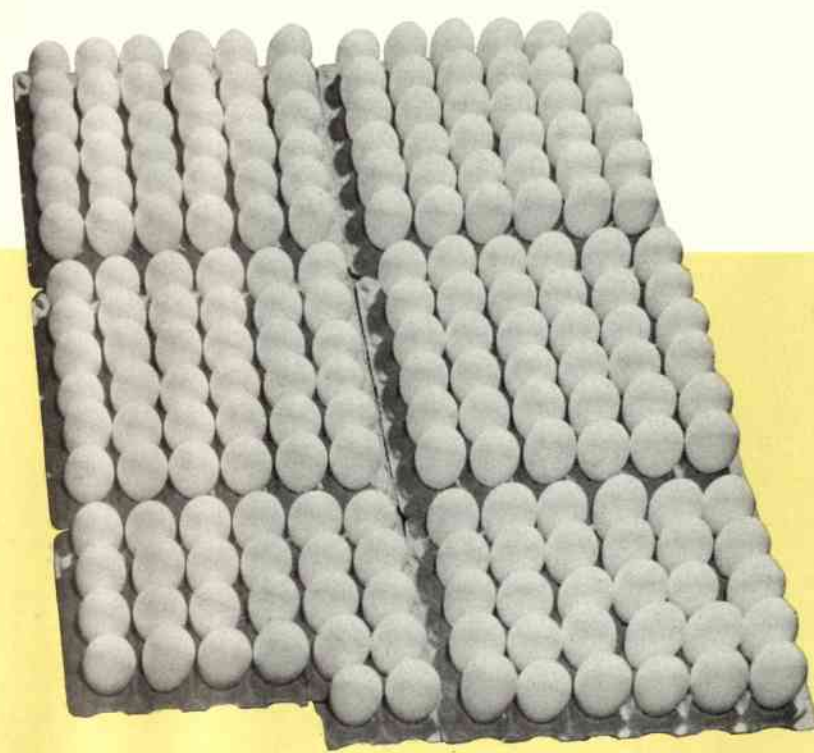


A meat inspector in a slaughter house, grading the carcasses of steers from a field feeding trial that demonstrated antibiotic and hormone benefits.



A group of researchers from throughout the world at one of many seminars held at Terre Haute every year on animal health nutrition.

AND PROGRESS IS MEASURED BY PRACTICAL RESULTS



Extra-production laying feeds—improved health, gains, efficiency.



Terramycin-fortified broiler rations—increased feed efficiency.

Antibiotic control of leptospirosis—the proof was found in sow's urine.

Beef conditioning feeds—new 5-day program cuts shipping fever losses.



No new method is considered practical until it has been backed by thorough, solid documentation of facts obtained from scores of experiments at Terre Haute and throughout the country. In five years, these facts can accumulate into a mountainous wealth of information.

For example, on an average day, over 500 groups of animals will be involved in current research.

Some projects, such as the study of unidentified growth factors, have involved more farm animals than the total human population of a city the size of Des Moines.

And in still other feed experiments with chickens, thousands of birds have been individually wing banded, weighed and observed daily, and their progress analyzed by a statistical staff with electronic IBM machines.

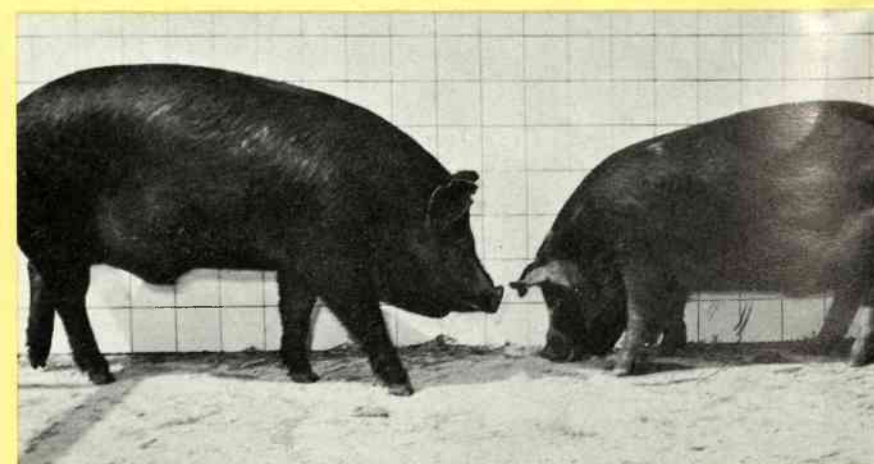
What happens to all this information?

Some facts materialize almost immediately into new products or techniques of benefit to the feed industry.

Others, while little more than scientific curiosities today, need only the development of additional pieces of information to complete their jigsaw pictures.

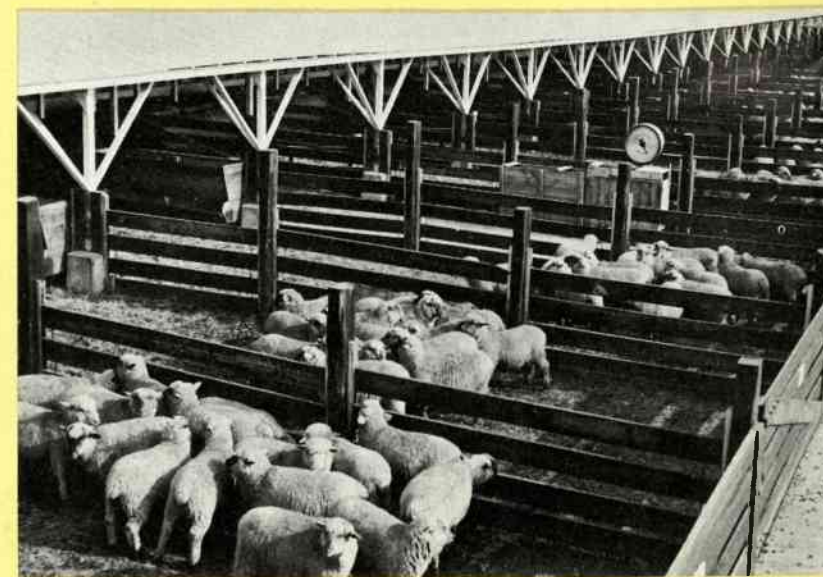
And still others have served the valuable purpose of proving that these blind alleys need never be explored again.

Cooperative development work between Pfizer and the feed industry over the past five years has produced many direct benefits and promises even greater future progress.



Vigofac—new source of UGF. Promotes growth of calves, hogs, chickens, turkeys.

Antibiotics for sheep—healthier, faster gains at lower cost.



From research to reality

Synthetic Sow's Milk. One of the first projects studied at the research center. Work on this subject helped demonstrate the possibilities of an entirely new market and type of formulated feed.

Pig Starters and Pre-Starters. Scientists at Terre Haute helped document some of the original research on these new feeds . . . helped pave the way for bigger, healthier litters.

Stabilization of Vitamin A. One of the major achievements of the research center. Work in this field led to a new, performance-tested, stabilized, oxidation-resistant vitamin A for the feed industry.

Fortified Calf Starters. New way to raise calves. Research with vitamin A and antibiotics for calves helped prove the benefits of this new feeding system to produce thrifter, faster growing calves.

Vigofac. A major achievement in animal nutrition. Work at the center developed the first standardized source of UGF. Continuing research guarantees a uniform, guaranteed UGF source with a constant assay.

Hormones for Steers and Lambs. Another phase of the original work at the research center. Continuing work in this field is helping develop new uses for this important group of feed ingredients.

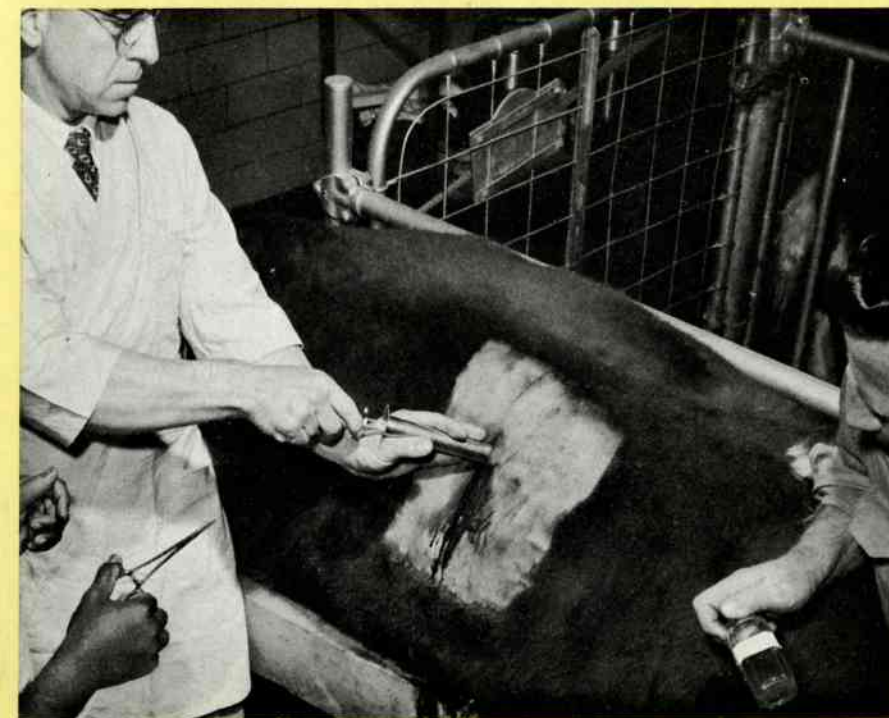
High Level Feeds. An industry-wide development which the research center helped document. Pfizer's market-building program helped the feed industry turn this new specialty feed into a profitable line.

Extra-Production Laying Feeds. One of the newest of formulated feeds. Work at the research center helped establish the value of antibiotics for increasing egg production.

5-Day Beef Conditioning Feeds. Research by Pfizer and the feed industry helped develop a practical program for control of shipping fever through the feed.

Nutritional Levels of Antibiotics for Beef. Thousands of cattle were tested to help document this new specialty feed application for antibiotics.

Antibiotic Control of Leptospirosis. Another research first. Work at Terre Haute demonstrated that antibiotics in feed could successfully control this disease. And another feed market opportunity was opened.

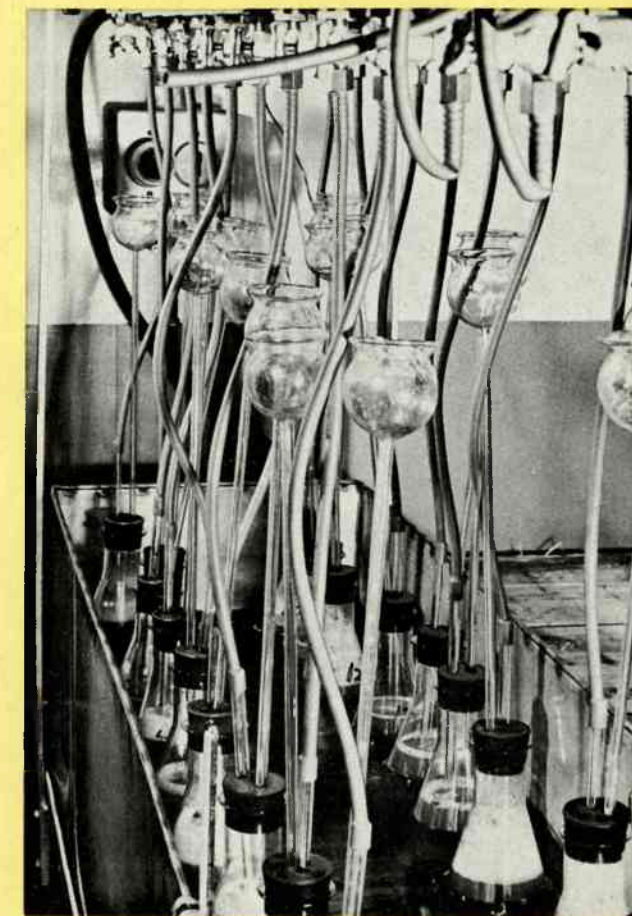


Vitamin A—proof of greater availability shown in liver samples.

Antibiotics for ruminants—documented in the artificial rumen.



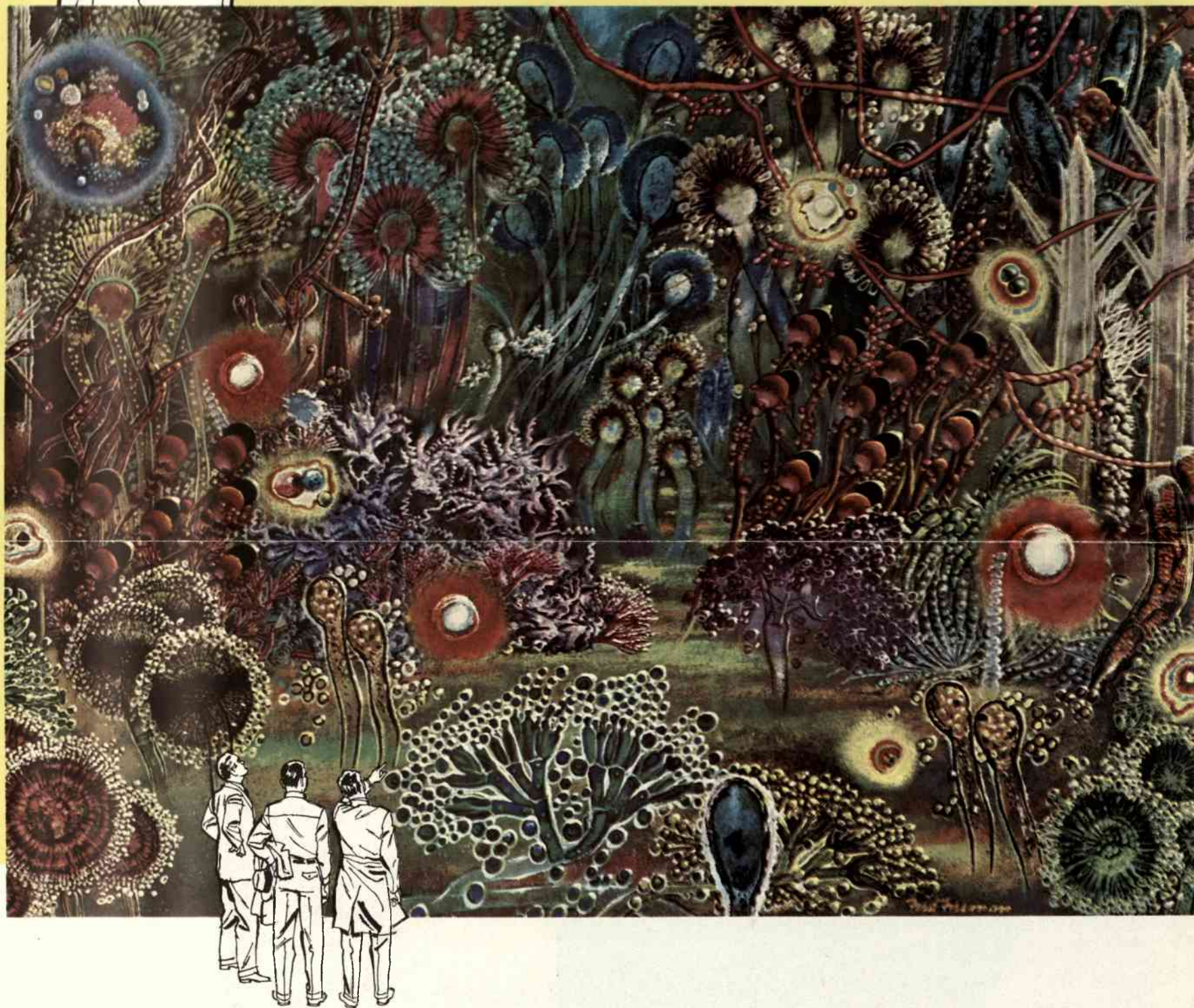
New markets for feed—the stories are told on the feed tags.





After Five...

During the next 5 years, what next from Pfizer and the feed industry?



Somewhere in this magnificent jungle . . . the microscopic forest of molds . . . in the bark of a tree . . . a pinch of soil . . . or the fertile ground of imagination—there lie the answers to some of our age-old problems.

More meat, more milk, more eggs from every pound of feed . . . new ways to fight disease . . . better control of fertility . . . new protection against stress—new slices of science ready to be translated into a new feed formulation.

Tomorrow may hold these answers, but of this much you can be sure—whatever the new development, it first will be tested, proven and documented to make sure it can deliver increased performance and profits for your customers' feed dollar.

Science Comes to the Farm in a Feed Bag



Pfizer Agricultural Research and Development Department



Industries (H.I.)

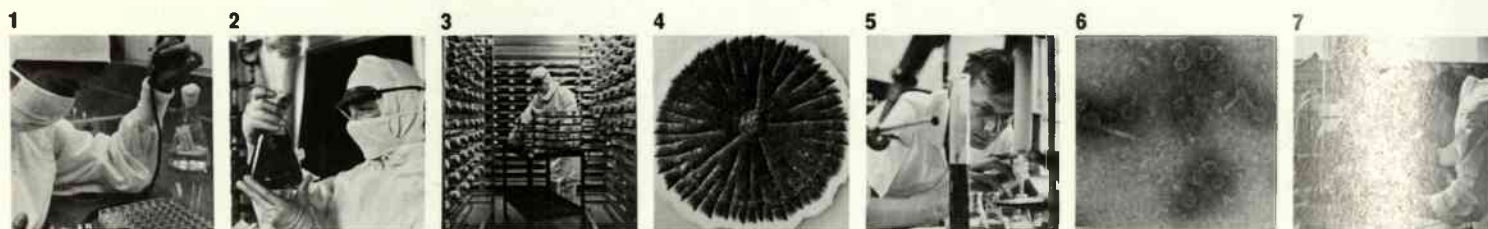
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Pfizer today is a diversified, multinational organization with a broad base of products for medicine, industry, agriculture and the home. As a service to editors, the Pfizer Photo Library stocks hundreds of photographs showing research, manufacturing and marketing operations in the company's many businesses throughout the world. A sampling of the kinds of photos available is shown in this convenient file folder. Full negative 8 x 10 glossy prints, as well as color transparencies, are supplied, with captions, on request. Order by number from this folder. For help with your specific photo needs contact:

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PHARMACEUTICALS



1. Antibiotic quality control 2. Antibiotic production 3. Growing measles virus for vaccines 4. Penicillin mold 5. Chemical synthesis 6. Leukemia virus 7. Pharmacological research



8. Sterile control area



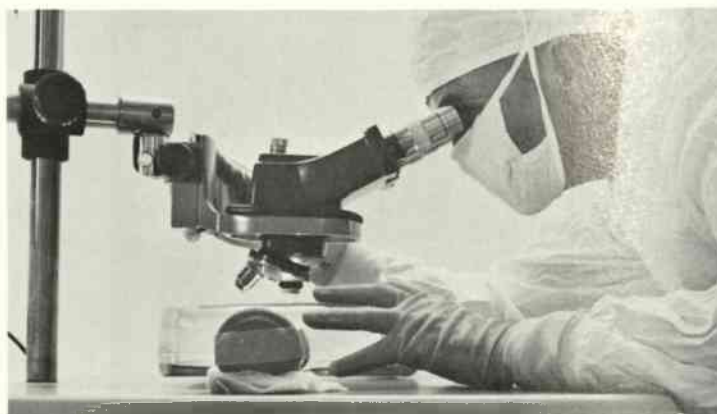
9. Transferring antibiotic culture



10. Chemical research laboratory



11. Tablet production



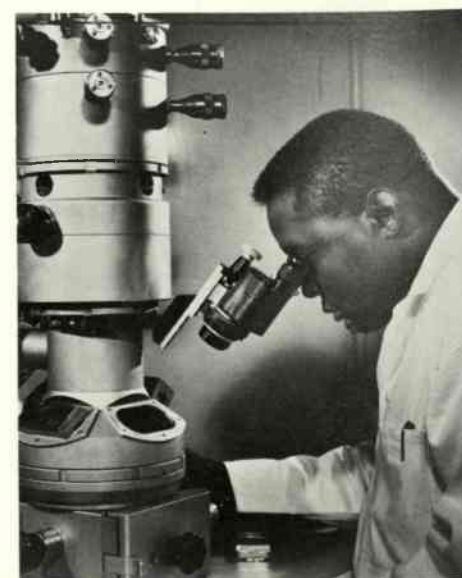
12. Measles vaccine research



13. Medical research—United Kingdom

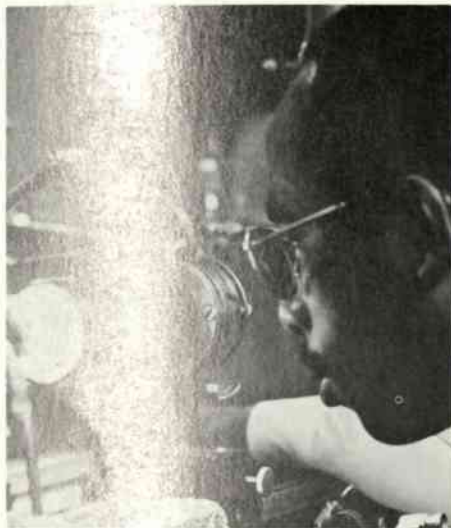


14. Japanese pharmaceutical production



15. Electron microscope in cancer research

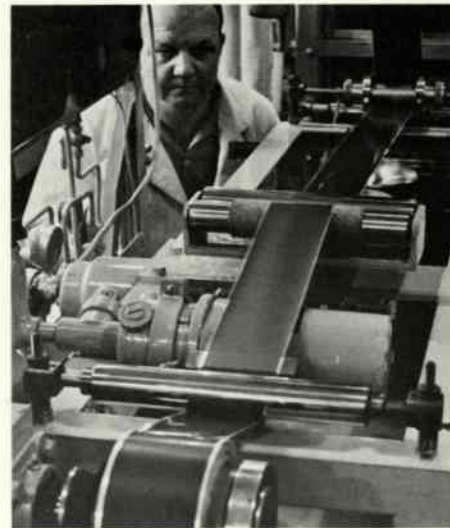
INDUSTRY



16. High-temperature materials



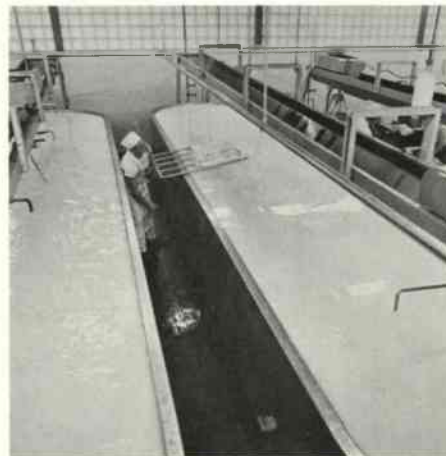
17. High-purity metal strip



18. Coating magnetic tape



19. Talc packaging



20. Cheese manufacturing



21. Chemical tank-car loading



22. Fumaric acid plant



23. Organic chemical production



24. Electronics testing laboratory



25. Bottling infant milk formula



26. Mining in Death Valley



27. Atomic absorption unit



28. Pyrolytic graphite hardware parts



29. Stabilizing road with lime



30. Food additives



31. Coty perfume "sniffer"

REFERENCE
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Industries (V.H.)

AGRICULTURE



32



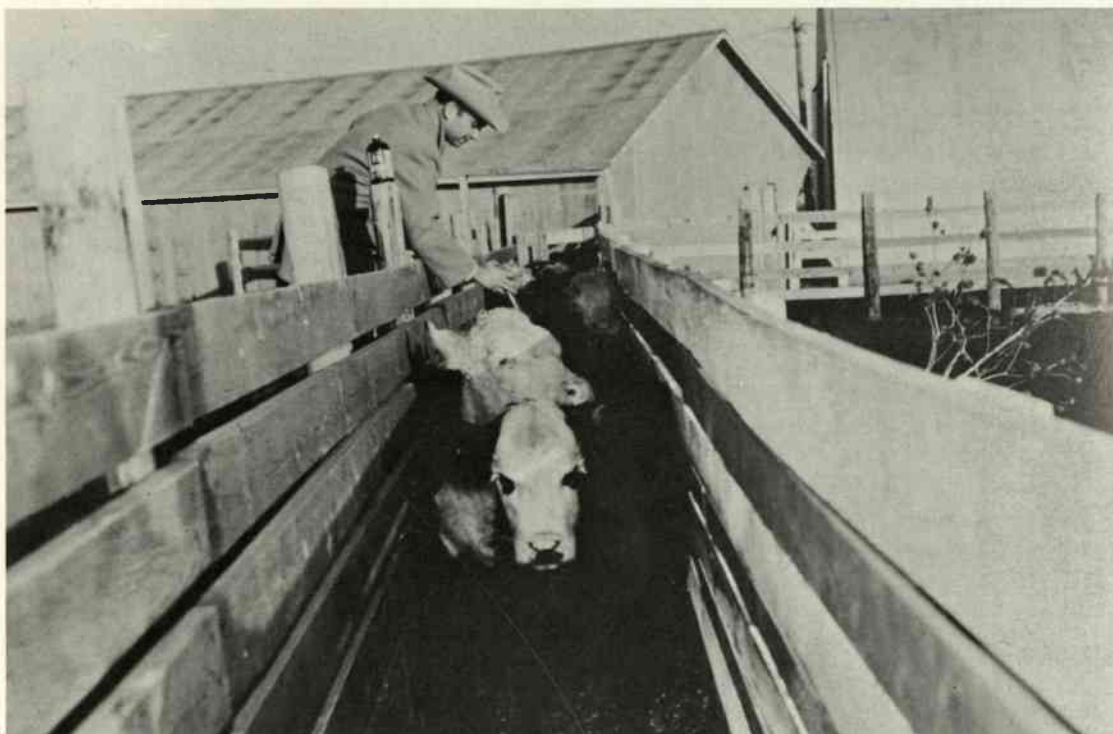
33



34



35



36

32. Poultry farm in Japan 33. Veterinarian in Brazil 34. Animal feeds in Africa 35. Bottle-feeding lamb 36. Treating steers

HOME, BEAUTY & FASHION



37



38



39



40



41



42



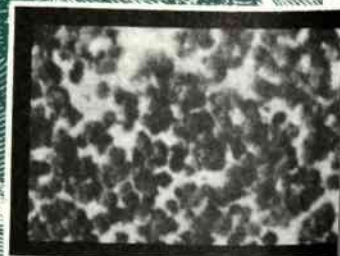
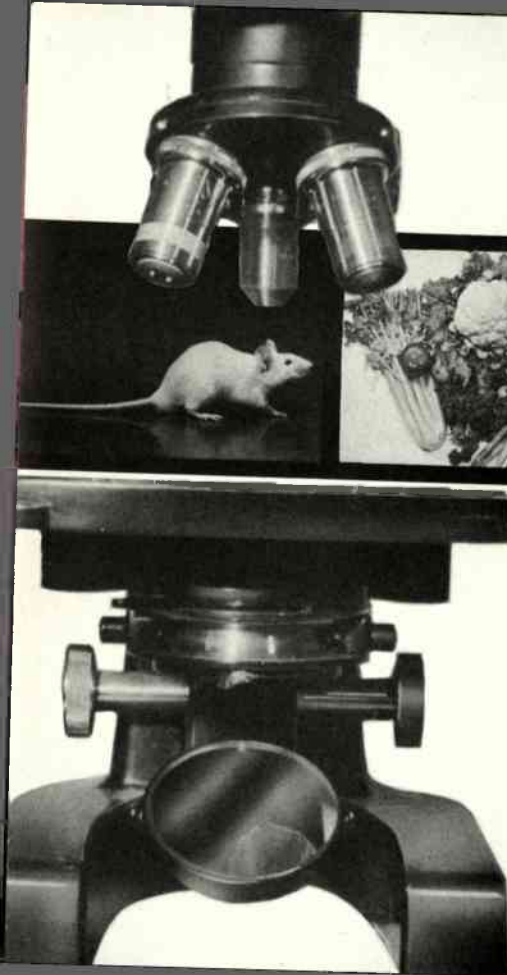
43

37. Plastic utensils in Nigeria 38. Coty lipsticks 39. Skier with Ben-Gay lotion 40. Facial contour kit 41. Silk'nSatin bath oil 42. Japanese cosmetics salon 43. Baby with milk formula

there were only man's hands

and brain and raw materials . . .

Today, we have...



Molecules Made To Order

Just a half century ago the chemical industry ranked low in the United States economy. Now it's the country's fourth largest industry. In recent years it has been growing three times faster than the average American enterprise.

Why has chemistry suddenly grown to such importance? It has happened because the chemist has learned how nature creates. He has broken down nature's products, atom by atom, and has recombined the pieces in new forms previously unknown.

He has learned to make rubber from crude oil, textile fibers from trees and plastics from coal. He has learned to harness microscopic living organisms for production of lifesaving drugs and valuable industrial chemicals.

Generations of alchemists futilely sought the "philosopher's stone," mythical forerunner of the catalysts used by modern chemists to create thousands of useful products.

THE CHEMIST has learned so much about nature, in fact, that he often can build molecules to order. Scientists have made diamonds from coal dust. They have taken a virus apart and recombined the lifeless fragments into a growing, reproducing substance.

The new way the man in the laboratory looks at nature has changed the way we live and even how long we live. He is beginning to make us independent of nature's whims.

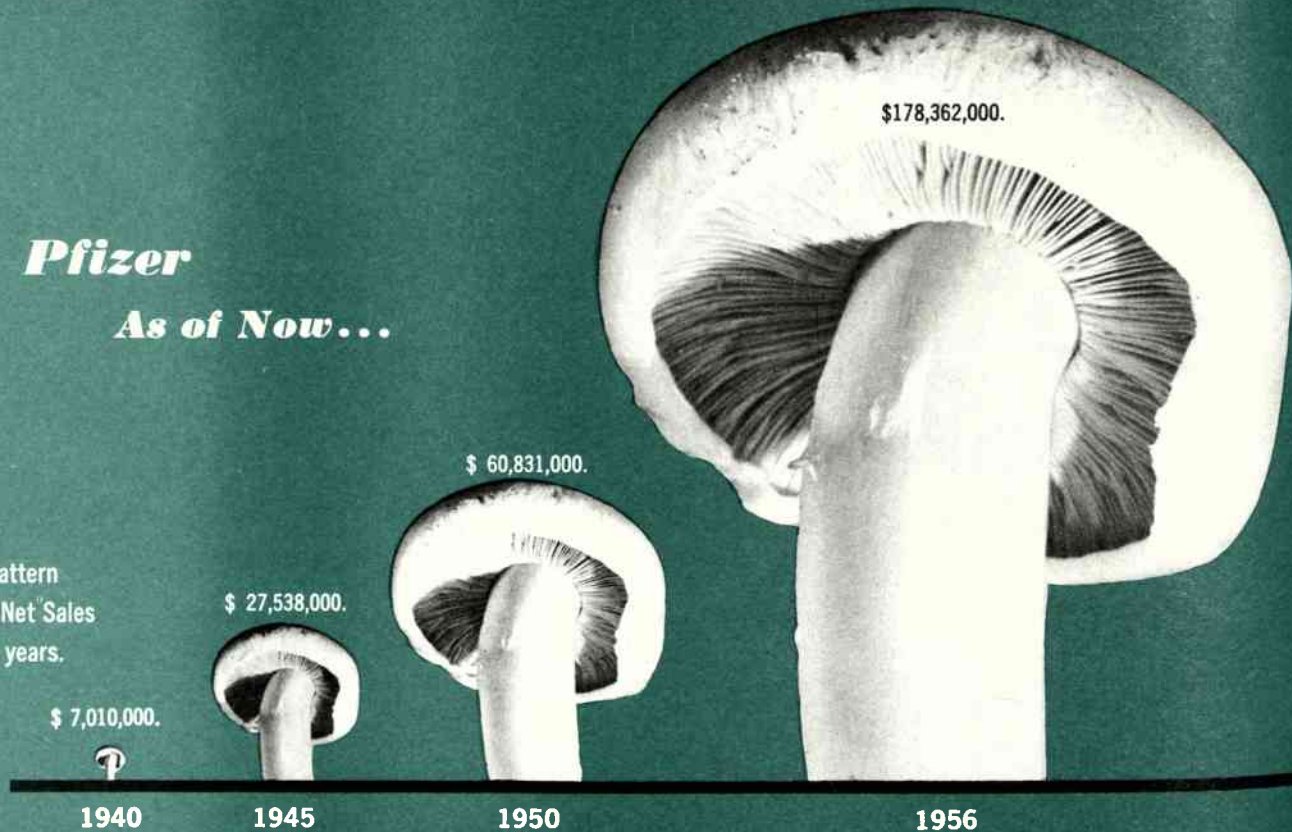
Out of the test tube have come hundreds of new industries, hundreds of thousands of new jobs. Chemistry has become essential to world progress.

Advances in organic chemistry today make it possible to tailor-make new molecules, and in many cases to transform natural substances into hundreds of products which look and act entirely unlike the original substance. A typical example is this lump of coal, from which chemists have extracted such widely differing products as synthetic rubber, dyes, saccharin, cooking gas, fertilizers, fungicides and pharmaceuticals.



Pfizer
As of Now...

Growth pattern
of Pfizer Net Sales
in recent years.



Chas. Pfizer & Co., Inc.

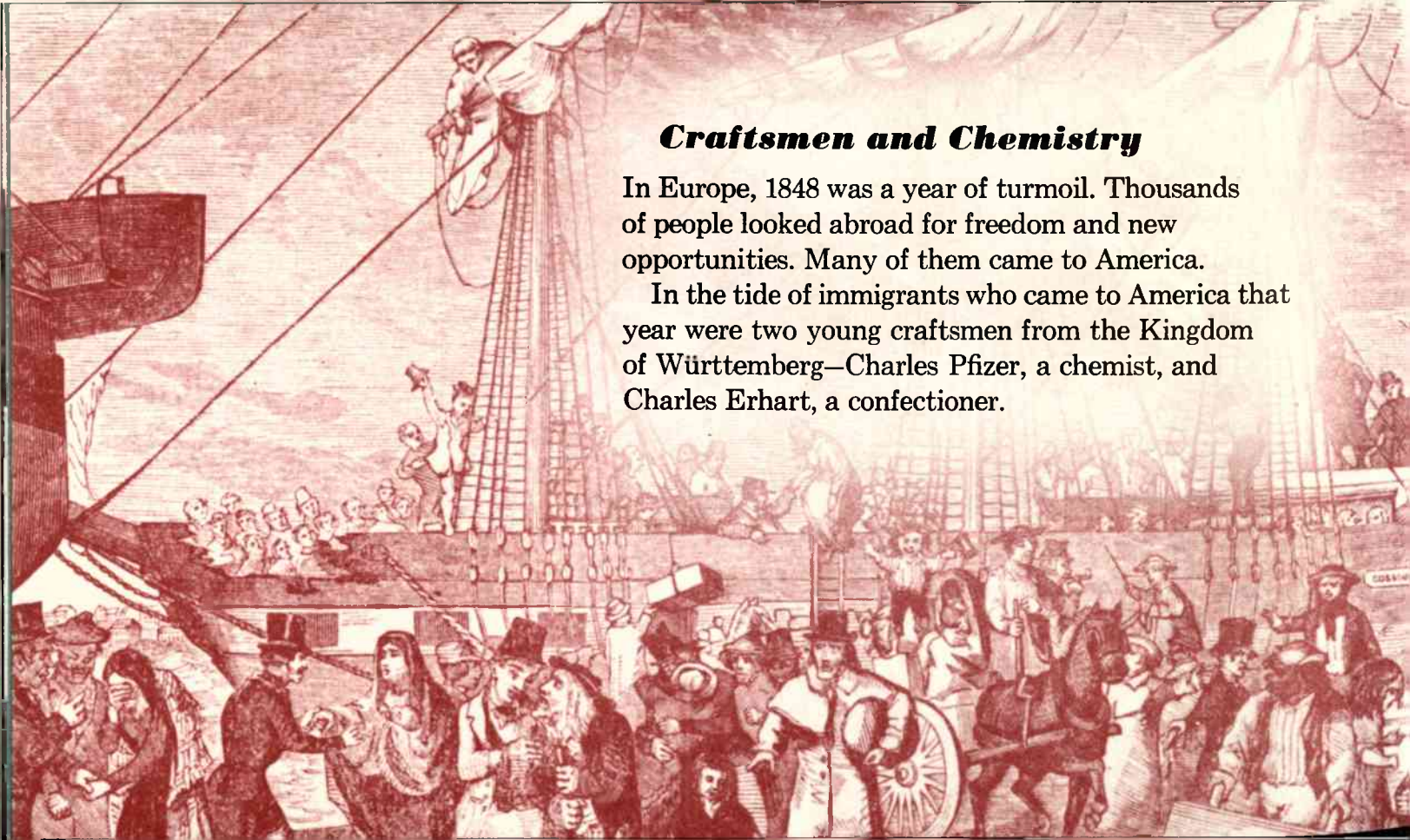
... world's leading producer of antibiotics, is the 207th largest industrial corporation in the United States. It is also a leading producer of hundreds of other products—pharmaceutical specialties for doctors, dentists and veterinarians; fine chemicals for industry; feed and health products for the farmer's livestock and crops.

... manufactures its products at three plants in the United States and 14 abroad.

... markets them through four major domestic divisions and the international subsidiaries, which serve medicine, pharmacy, agriculture, industry and government in the United States and throughout the world.

... channels them to customers through six domestic distribution centers and nearly 100 agencies overseas.

Even in as fast-growing an industry as chemicals, the mushroom growth of Pfizer is extraordinary. In the 24-year period from 1933 to 1956 (inclusive), the Company's net sales increased by more than 4,500 per cent. Pfizer's net sales gain in the last ten years alone has been fourfold.



Craftsmen and Chemistry

In Europe, 1848 was a year of turmoil. Thousands of people looked abroad for freedom and new opportunities. Many of them came to America.

In the tide of immigrants who came to America that year were two young craftsmen from the Kingdom of Württemberg—Charles Pfizer, a chemist, and Charles Erhart, a confectioner.

America was speeding into a new age. Industry was taking giant steps forward. Railroads were pushing the American frontier westward to the Pacific. Gold was discovered in California. Thousands rushed headlong to the West.

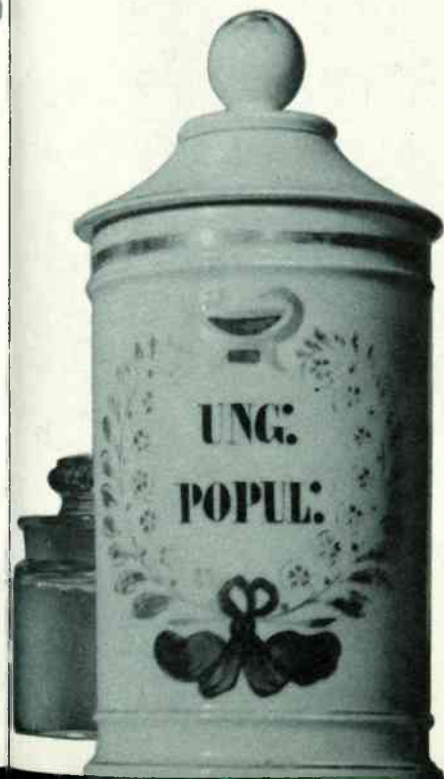
But Pfizer and Erhart stayed in New York. They had brought with them from Europe something that turned out to be more valuable than anything panned out of the California streams—old-world craftsmanship and devotion to quality. In 1849, the two Württembergers set up shop in Brooklyn as specialists in fine chemicals.



THE FIRM STARTED with one product, a medicinal called santonin, used for treating intestinal worms. Within ten years Pfizer was turning out iodine preparations, mercurials, bismuth compounds, borax and quite a few other chemicals.

Then, in 1880, Pfizer and Erhart began producing citric acid, one of the most useful of all chemicals. It adds "tang" to soft drinks; puts new life in "dead" oil wells; finds its way into inks, dyes, pharmaceuticals, ointments and hair rinses, into silver plating and candy; helps put fizz into headache powders; adds desirable properties of many different kinds to plastics; and has a thousand and one other uses. After the Civil War, food processors and drug makers were finding so many new uses for citric acid that demand outran the supply.





BACK IN THOSE DAYS, citric acid was made from raw materials extracted from lemon and lime juice. Pfizer imported the crude chemicals from Italy and turned out finished citric acid.

Over the next two decades and into the 20th century, Pfizer became a leading producer not only of citric acid but of tartars and other ingredients needed by the food-processing industry.

But supplying citric acid always had its problems. There was no telling from one year to the next if raw materials would be available or what the price would be. When lemons were bringing high prices in fruit markets, you couldn't expect the grower to set aside much of his crop for making citric acid.

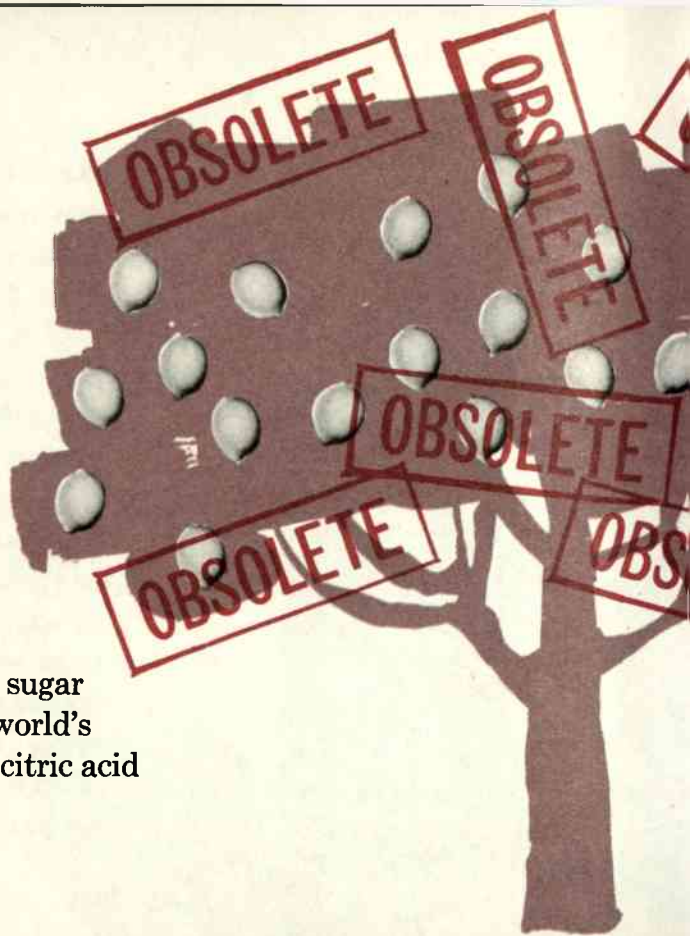
So one day Pfizer chemists began looking for another way to produce it.

A Common Black Mold

The way chemists tackled the citric acid problem demonstrates how science studies nature and learns to control it. A substitute had to be found for undependable raw materials. Might controlled fermentation hold the answer?

In 1914, Pfizer chemists began to study all kinds of molds: how they live and what they “eat.” This took imagination. Very little was known about those microscopic organisms.

But by 1919, Pfizer scientists had “trained” a common black mold called *Aspergillus niger* to transform ordinary sugar into citric acid in a pilot plant. In 1923, Pfizer set up the world’s first full-scale citric acid fermentation plant. The price of citric acid dropped 75 per cent.

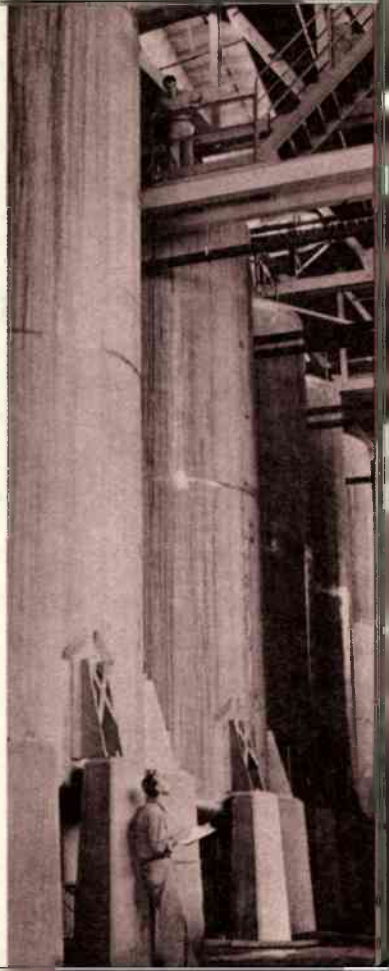


ABSOLUTE

LETE

It took nature years to make a lemon tree and months to make it bear fruit. It took more weeks to extract pure citric acid from the fruit juice. Through controlled fermentation, chemists could make a batch of citric acid in less than two weeks —with no concern for sun, rain or season.

It was this research that made Pfizer a world leader in fermentation chemistry. It opened up a whole new world of industrial science. Through fermentation, Pfizer in 1929 became the world's first company to mass-produce gluconic acid at low cost and later one of the first to make synthetic vitamin C on a commercial scale. Nobody knew it then, but Pfizer's work with citric acid was to help put penicillin into the doctor's hands. What has citric acid to do with penicillin? Both are produced by molds through fermentation.

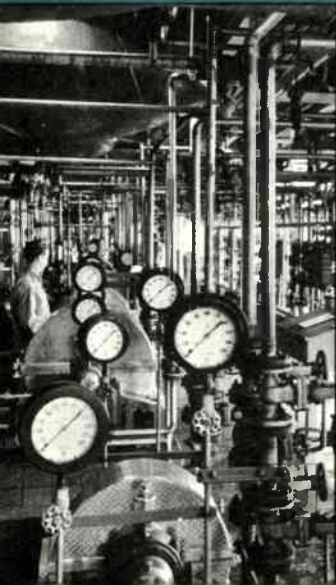


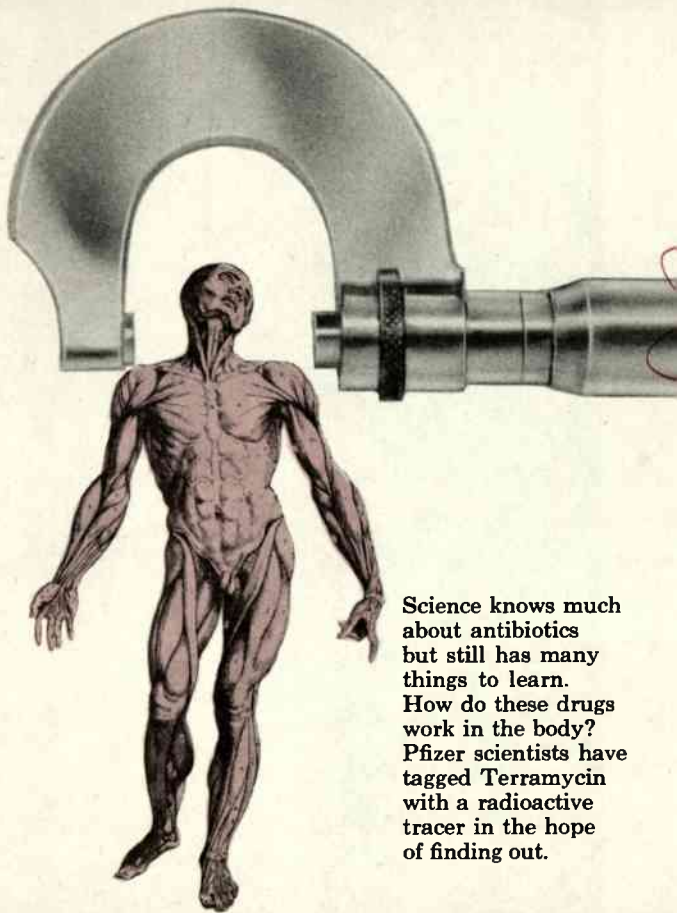
Penicillin by D-Day

It was more than chance that put Pfizer in the foreground of antibiotic production. Pfizer had been making medicines for nearly a century when a group of British scientists, headed by Sir Howard Florey, came to the United States in 1941 to seek aid in mass-producing Sir Alexander Fleming's penicillin. Pfizer already had the basic knowledge from years of experience with molds and fermentation. In fact, the Company's chemists were working on penicillin several months before they sat down to discuss the problems with scientists from England, the United States government, and other American drug firms. That was in October, 1941.

Pfizer began delivering penicillin to the government in the spring of 1942. But it wasn't until 1944 that all the big problems were ironed out. In between were months filled with some of the toughest production problems an industry had ever been asked to crack.

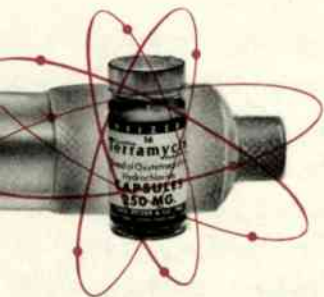
Methods had to be worked out to force tiny organisms to live and produce penicillin under water in huge tanks which replaced hundreds of thousands of laboratory flasks and milk bottles. Sterile fermentation systems had to be designed and rigidly protected against encroaching microbes which would destroy the drug. Ways had to be found to separate micro-quantities of penicillin from a hodgepodge of other unwanted chemicals in the fermentation tanks. Scientists and engineers worked day and night—and they solved the problems in record time.





Science knows much about antibiotics but still has many things to learn. How do these drugs work in the body? Pfizer scientists have tagged Terramycin with a radioactive tracer in the hope of finding out.

Penicillin was in the hands of Allied medics in time to save thousands of lives and limbs during the biggest battles of World War II.



At war's end, Pfizer was producing more than 50 per cent of the world's penicillin.

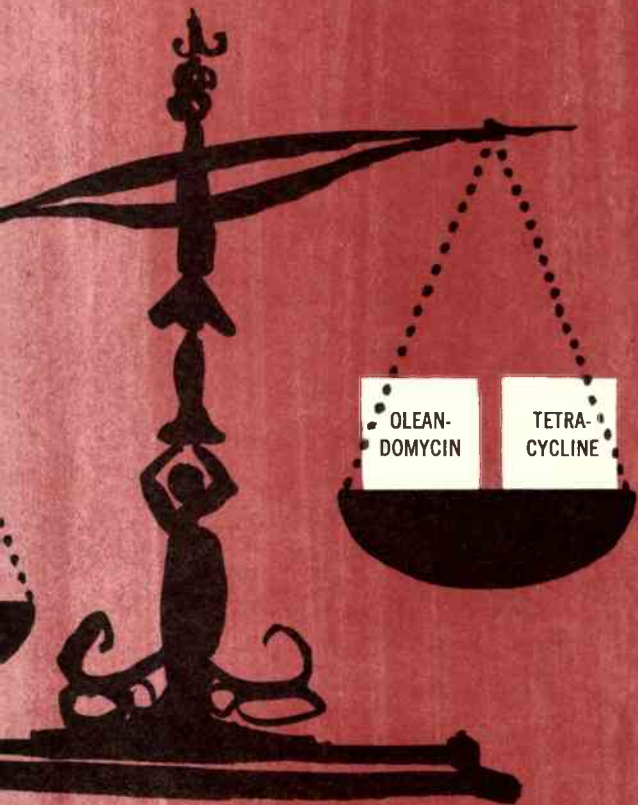
Penicillin opened the way to production of other antibiotics. When streptomycin was discovered, in 1944, Pfizer quickly became a major producer of that antibiotic, too.

Year after year the Company added one antibiotic after another and today produces 12 of the 17 antibiotics in use for human therapy.

In producing penicillin, industrial science had learned to marshall life's primitive creatures in the service of medicine. And when scientists discover a basic fact about nature, one thing is sure to lead to another. Penicillin led Pfizer into some unsuspected research territory.

Synergism: In Sigmamycin, curative effect of two antibiotics combined exceeds total effect of each given separately.





OLEAN-
DOMYCIN

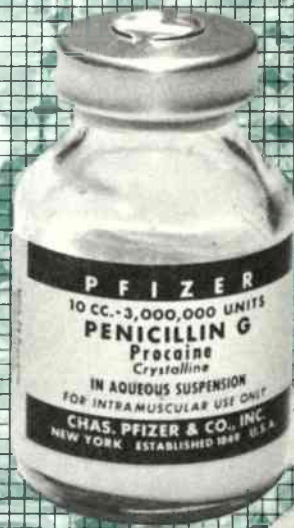
TETRA-
CYCLINE

Test Tube and Slide Rule

Driving south from Terre Haute, Indiana, you come to a 700-acre experimental farm about five or six miles outside the city—far from the important centers of industry and medicine. This is Pfizer's Agricultural Research and Development Center.

The Center's origin goes back to the days after World War II when Pfizer set up a vast antibiotic research program and began testing soil samples from all over the world in its Brooklyn laboratories. After almost three years of work, scientists sifted out the Company's biggest research find—Terramycin.





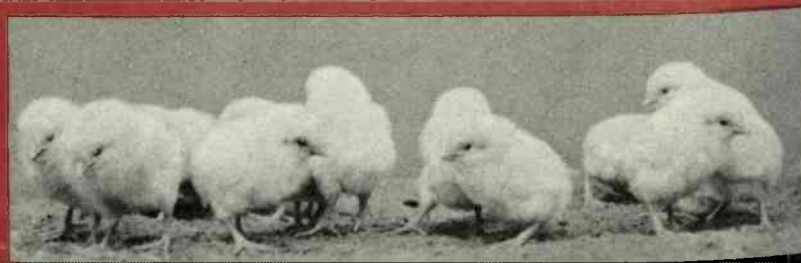
Terramycin turned out to be one of the most valuable drugs in human medicine. And it led research all the way from the clinic to the barnyard.

Scientists found out quickly enough that Terramycin could rout not only more than 100 human diseases but scores of livestock ailments that were seriously cutting into the farmer's profits. But there was an unsuspected side to this research, too. They found that just a pinch of the antibiotic in livestock rations boosts the growth rate and weight of animals and poultry. It even increases a hen's egg-laying rate. Almost overnight, Pfizer found itself deep in scientific agriculture.



Since then, the Company's agricultural researchers have developed hormone and vitamin feed supplements and new unidentified growth factors that put more meat on livestock and cut down the farmer's feed bill at the same time.

Antibiotic research led to still other things. While studying Terramycin's structure, a Pfizer scientist came up with a new broad-range antibiotic—Tetracycline (tetracycline). Other Pfizer scientists developed a method of extending the freshness time of food with Biostat, a combination of oxytetracycline and citric acid. Still others found that antibiotics can control a whole range of plant diseases. With Agri-mycin (Terramycin and streptomycin), the farmer can stop many kinds of

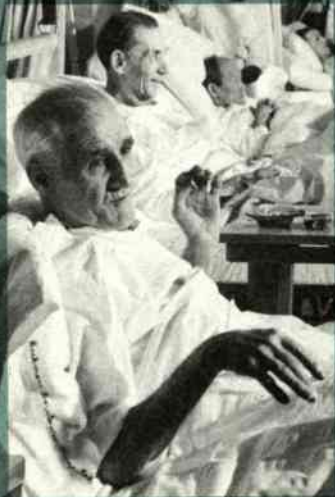


microbes which once thrived on his crops and pillaged his orchards.

Antibiotics are still a big part of the Company's research picture. Recently, for example, Pfizer scientists developed Sigmamycin, an antibiotic combination not only effective against a broad range of general infections but also lethal to a hardy group of resistant germs which have held out against attack by other drugs. But the Company has taken some entirely new research directions, too.

Apart from antibiotics, Pfizer research and development has contributed drugs to treat nausea, arthritis, mental illness, high blood pressure, asthma, cold symptoms and anxiety. It has made possible a whole series of industrial chemicals never before mass-produced.



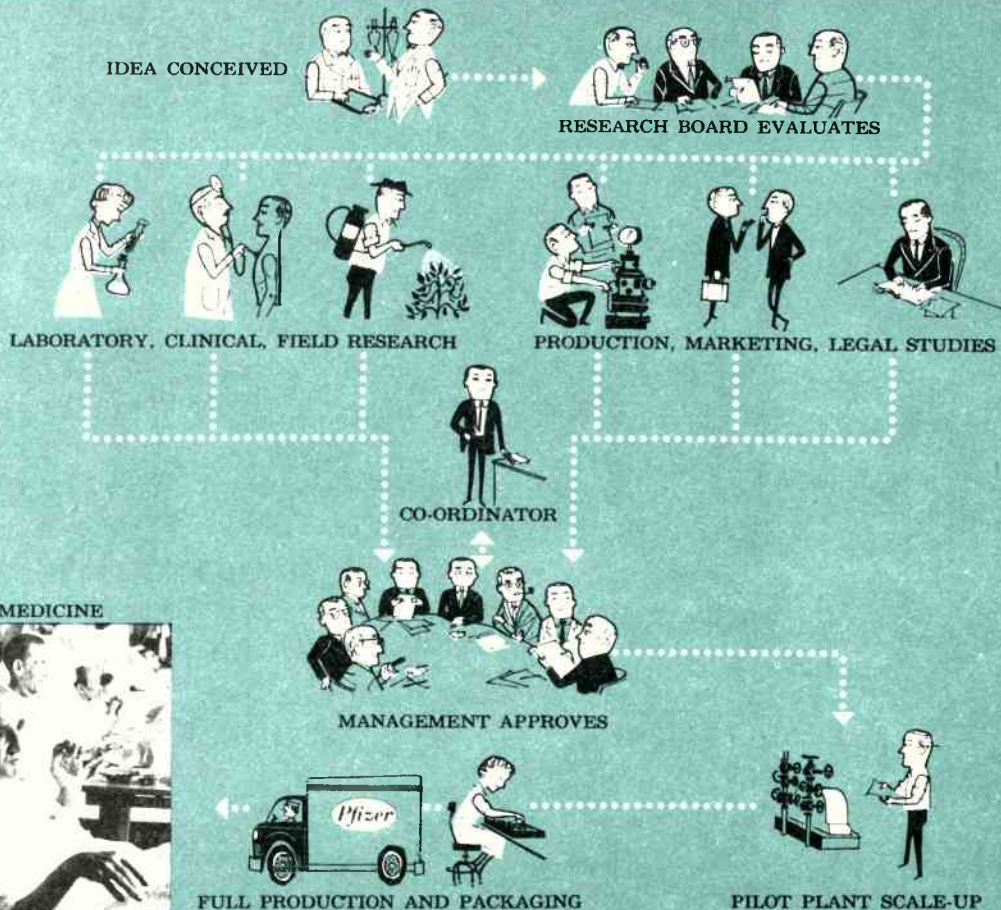


The same kind of research teams which discovered and developed Terramycin are now hard at work to find other useful products—new or better drugs to treat cancer, the common cold, tropical diseases, tuberculosis, heart and mental ailments, nutritional disorders and old-age afflictions. They are seeking better ways to make products for home and industry at lower cost, and new means to boost farm productivity even further.

But the biggest laboratory discoveries mean very little if products can't be mass-produced at reasonable cost.

PFIZER **RESEARCH** **AND** **DEVELOPMENT**

*Teamwork Links
Ideas with Realities*



As a pioneer of industrial fermentation chemistry, Pfizer has unraveled production knots that might otherwise have bound many an important discovery to the laboratory bench. At the same time, management places equal emphasis on organic synthesis as a production tool. Thus, at Pfizer organic chemists and biochemical engineers work side by side solving the complex problems of modern chemical production.

Pfizer has been able to get products to market quickly because of this two-way approach to production. The Company's engineers can use fermentation (in which living microbes are made to transform one substance into another) or organic synthesis (in which chemists artificially build up the molecule they want). And quite often a combination of both methods is used.



Fermentation

Synthesis

Back in 1936, for instance, the Company was able to produce vitamin C by linking fermentation with organic synthesis. And in the last few years, Pfizer has been able by similar methods to turn out the antibiotic Tetracycline, steroid hormones such as hydrocortisone and Sterane or Deltacortril, and the tuberculosis drug Streptomycin. This two-way approach uses specially designed equipment with built-in flexibility. It gets products to market faster without delays for tooling up. And this, of course, works to the benefit of the doctor, the farmer, the industrialist, and all of us.

To Market, To Market...

Ten or fifteen years ago, Pfizer was known only as a manufacturer of fine chemicals used in food, medicinal and industrial products. Today, Pfizer is a major producer not only of fine chemicals but of pharmaceuticals and special products for the farm as well.

Before 1950, Pfizer's antibiotics and medicinals were sold chiefly to United States government agencies, domestic drug manufacturers and a relatively small number of overseas distributors. With the introduction of Terramycin, the Company began marketing to hospitals, retail pharmacies and wholesale drug outlets in the United States and throughout the world. In just five years, Pfizer added more new products than it had in all the 100 preceding years.

J. B. Roerig and Company, a well-established supplier of packaged vitamin and mineral preparations, was acquired in 1953 and made a division of Pfizer. A whole range of nutritional and pharmaceutical specialties was added under the Roerig label.

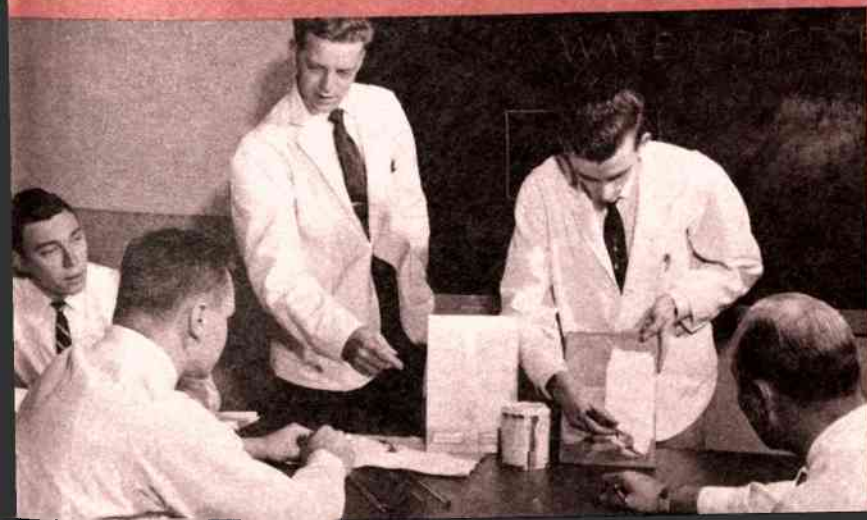
Antibiotics and other drugs in hundreds of dosage forms were formulated and readied for sale. Several non-prescription pharmaceuticals were developed.

At the same time, scores of new agricultural and bulk chemical products were coming out of the laboratories.



ALL THIS MEANT that an almost entirely new sales and marketing program had to be developed. Technical groups were established to advise hospitals, doctors, industry and agriculture on the use of Pfizer products. A corps of professional representatives who understand medicine and nutrition was formed to explain Pfizer's new products to doctors and druggists. Another group was trained to bring advances in science to the farmer and feed manufacturer. Distribution centers were built in key states to get products to market faster. New production facilities and research laboratories were established. Advertising was expanded and pinpointed to new markets.

It was probably one of the most far-reaching changes any firm ever went through, and it was all done in just a few years.





NEW PRODUCT TIME TABLE

NEW
ataraxic-corticoid

Ataraxoid

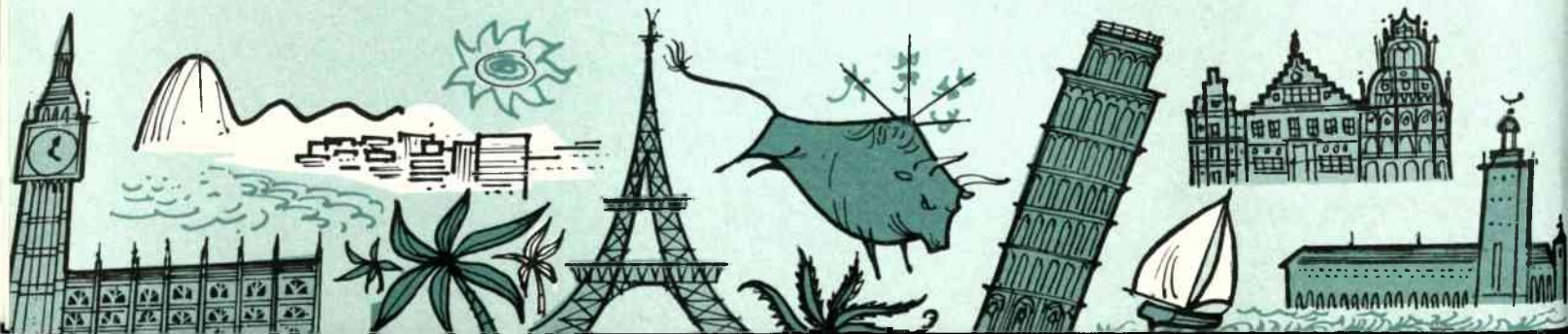
controls the
symptoms and
apprehension in
Rheumatoid
Arthritis,
other collagen
diseases,
bronchial
asthma and
inflammatory

Sigmamycin

Operation Everywhere

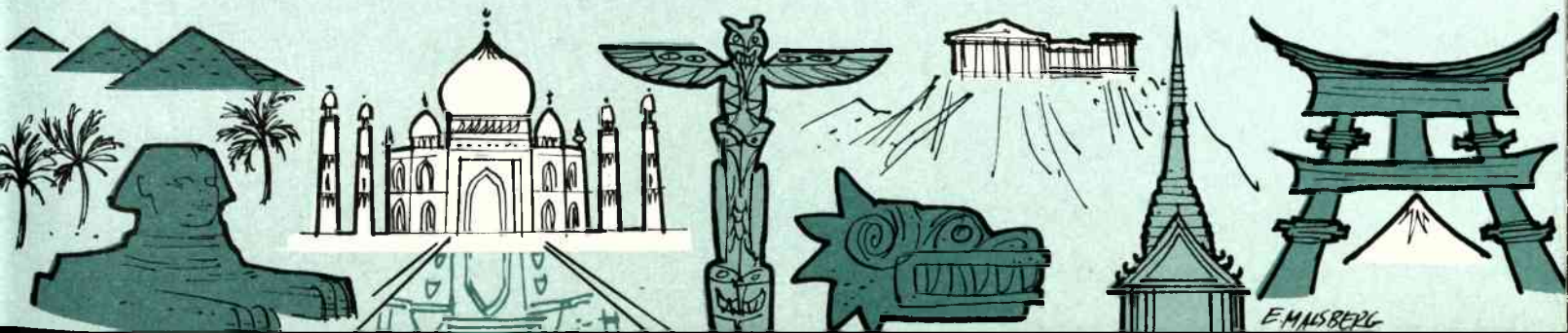
Pfizer's progress has been as brisk abroad as it has been at home. Before 1950, the Company's products, all made in the United States, were shipped abroad by American exporters and distributed by a few agencies in scattered countries.

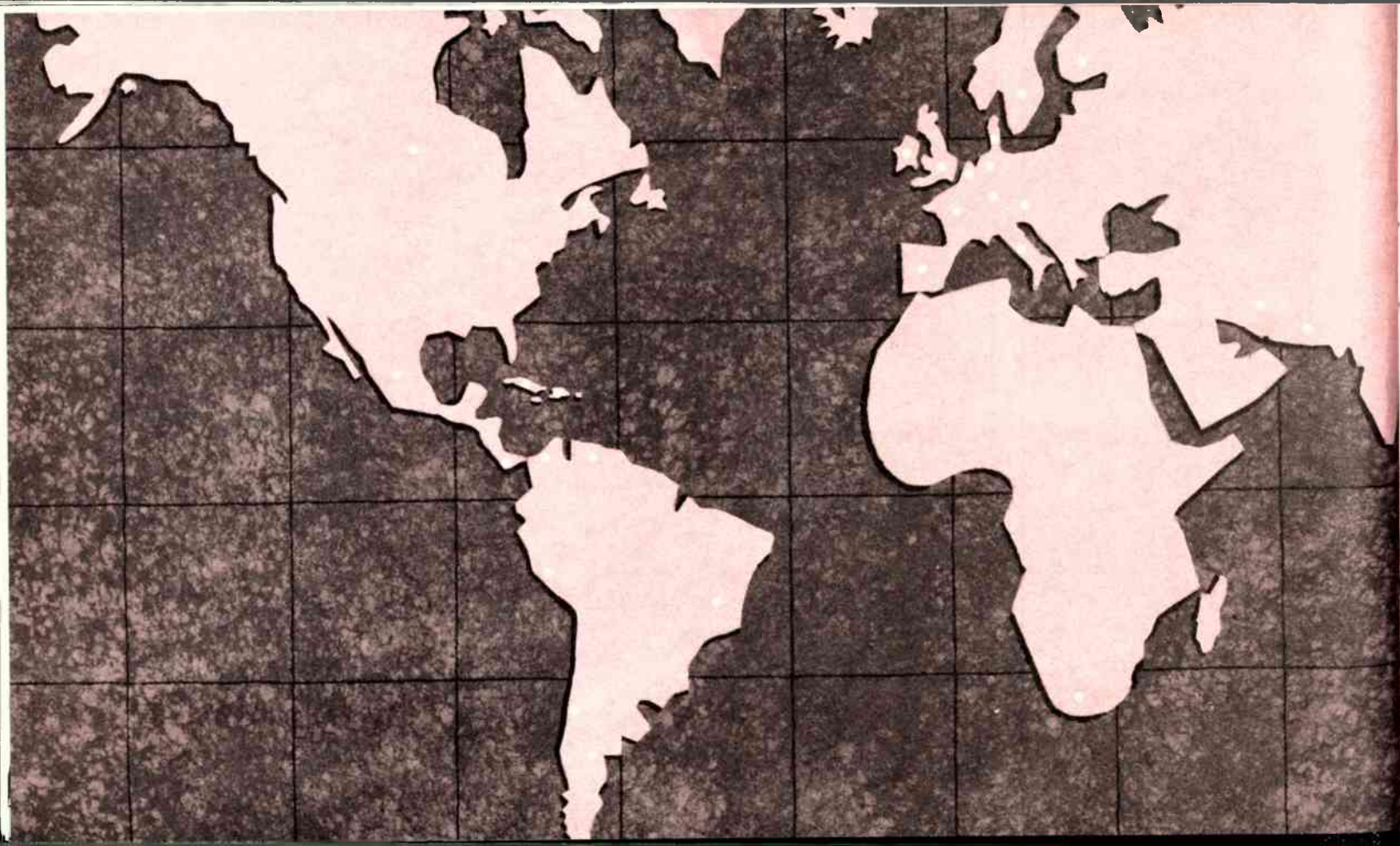
Today, Pfizer products are manufactured in 14 countries and are distributed in nearly 100 other countries throughout the world. Month after month over the past five years, production and packaging



operations have been expanded in Europe, the Far East, and North and South America. Fermentation plants have been erected in France, England and Japan. New production facilities have been blueprinted or are under construction in Argentina, Italy, Mexico and Turkey.

Through an international labyrinth of shipping regulations, import licenses, currency exchange restrictions and customs laws, Pfizer has traced smooth-flowing lines of distribution that penetrate to the outermost edges of the world map.







PFIZER INTERNATIONAL

PFIZER PRODUCTS ARE MANUFACTURED IN:

Argentina	Canada	Germany	Spain
Australia	Chile	Italy	Sweden
Belgium	England	Japan	
Brazil	France	Philippines	

PFIZER SALES OR PROMOTION OFFICES

WESTERN HEMISPHERE			FAR EAST
Argentina	Mexico	Belgium	Australia
Brazil	Panama	Denmark	Hong Kong
Canada	Peru	France	Japan
Chile	Puerto Rico	Germany	Pakistan
Colombia	Uruguay	Great Britain	Philippines
Cuba	Venezuela	Holland	
Ecuador		Italy	
	EUROPE, AFRICA and MIDDLE EAST	South Africa	
	Austria	Spain	
		Sweden	

MAJOR OVERSEAS DISTRIBUTION CENTERS

Panama	Belgium	Hong Kong	England
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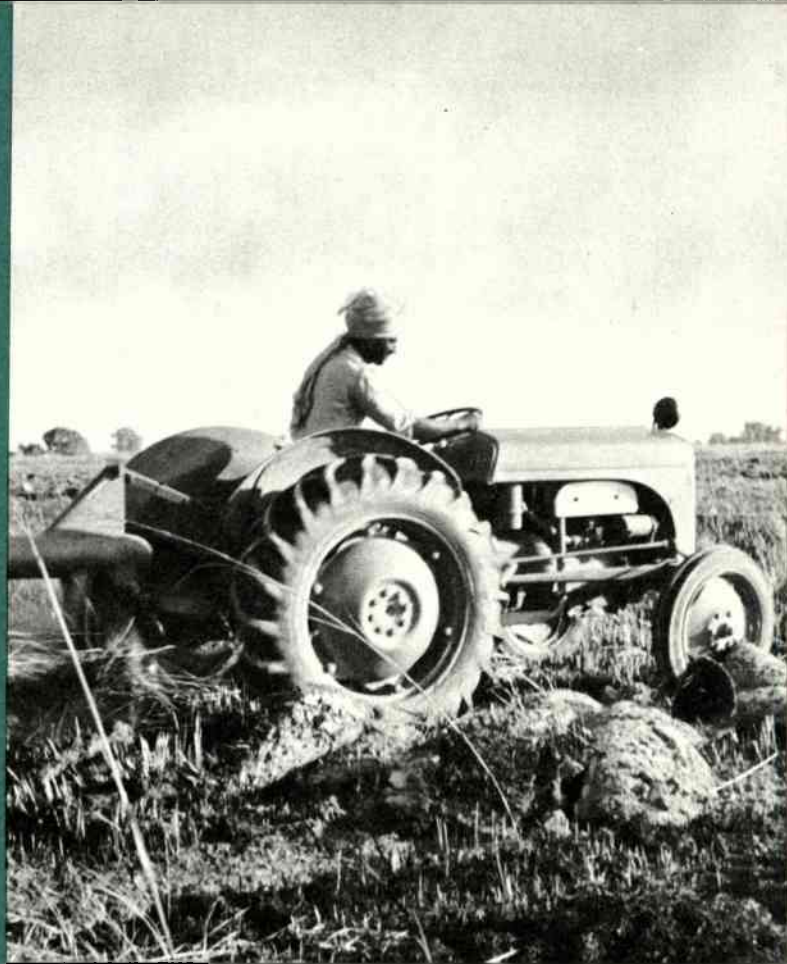
Pfizer products are also distributed in:

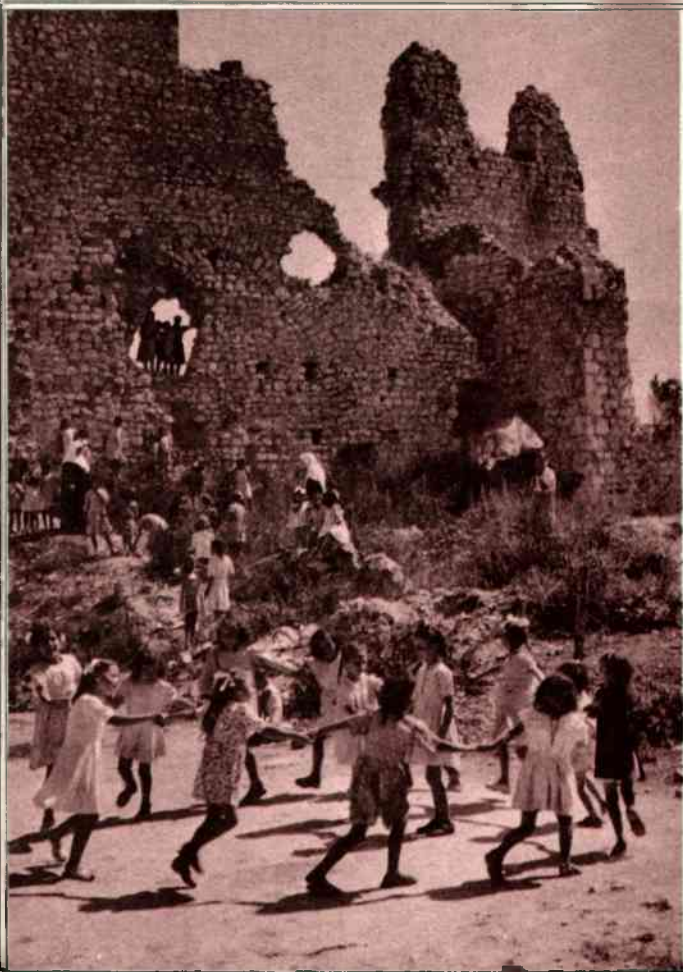
AFRICA	Sudan	MIDDLE EAST	Greece	Honduras
Algeria	Tunisia	Iran	Iceland	Neth. Antilles
Angola		Iraq	Malta	Nicaragua
Brit. E. Africa	ASIA	Israel	Norway	West Indies
Egypt	Burma	Jordan	Portugal	
Ethiopia	Formosa	Kuwait	Switzerland	OCEANIA
Liberia	India	Lebanon		Fiji Islands
Libya	Indonesia	Syria	NORTH AMERICA	New Zealand
Mauritius	Malaya	Turkey	Costa Rica	Samoa
Morocco	Port. India	EUROPE	Dominican Republic	SOUTH AMERICA
Port. E. Africa	Thailand	Cyprus	El Salvador	Bolivia
Somaliland		Finland	Guatemala	Paraguay
			Haiti	

THUS, IN LESS than a decade, Pfizer has been transformed from one domestic enterprise in the United States to a series of "domestic" operations, each one an integral part of its national industrial scene.

What does this expansion mean to people abroad? It means thousands of new jobs. It means new wealth and stronger national economies. In terms of well-being, the recent past points to what may be achieved in future years.

In just a decade, chemistry and modern medicine have begun to reclaim whole areas of the world where mass disease was once a lifelong burden—where progress has been smothered by sickness, poverty and hunger. Now this terrifying toll of human waste has begun to dwindle.





Before the antibiotic era, for example, 50 million humans were afflicted by tropical yaws. But organized programs of antibiotic treatment have returned hundreds of thousands of victims to work, increasing national incomes by millions of dollars. Antibiotics may one day stamp out trachoma, the ubiquitous eye infection of tropical regions which claims 400 million victims. Throughout the world, other mass diseases are yielding to modern drugs like penicillin, Terramycin and Sigmamycin.

Important, too, is the exchange of scientific ideas which this expansion has fostered. Students, engineers and scientists from all over the world learn of new developments at Pfizer's agricultural research center and at the firm's research laboratories in the United States. In turn, Pfizer scientists travel throughout the world to transmit ideas and to learn from colleagues abroad. Through this international liaison, scientific information is more quickly put to use for the benefit of everyone.



Money at Work

Until the turn of the century, Pfizer was conducted as a partnership. Then, in 1900, the firm was incorporated as a New Jersey corporation and in 1951 became a Delaware corporation by merger with a wholly owned Delaware subsidiary.

Sales and earnings rose sharply following the Company's entry into the field of antibiotics in the early 1940's. Sales in 1956 were \$178,362,000, 17 times as great as the volume recorded 15 years before. The 1955 annual *Fortune* survey listed the Company as the nation's 207th largest industrial concern based on sales and 130th based on earnings.



Dividends

per share
of common
stock

\$1.75

\$1.15

\$1.25

\$1.35

\$1.55

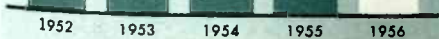
1952

1953

1954

1955

1956



Pfizer Common Stock was first sold to the public on June 22, 1942, and listed on the New York Stock Exchange January 17, 1944. The approximate 5,300,000 shares outstanding as of December 31, 1956, were in the hands of over 22,000 shareholders. No individual shareholder owned more than 2½ per cent of the Common Stock.

In August, 1947, the Company sold an issue of 50,000 shares of 3½ per cent Cumulative Preferred Stock to a group of insurance companies and institutional investors. Four years later, 150,000 shares of 4 per cent Cumulative Second Preferred Stock were sold publicly and listed on the New York Stock Exchange. As of December 31, 1956, the outstanding shares of these issues amounted to 41,258 and 46,182 respectively.

Year

1956

1955

1954

1953

1952

1951

1950

1945

1940

1935

Financial Summary

(All data in thousands of dollars, except per share data)

Net Sales	Net Income		Earned Per Share*	Dividend Per Share*	Total Assets**	Working Capital
	Before Taxes	After Taxes				
\$178,362	\$32,428	\$18,254	\$3.36	\$1.75	\$152,583	\$72,590
163,795	26,571	15,327	2.94	1.55	140,725	63,384
145,238	22,901	15,201	2.95	1.35	127,413	54,852
127,003	25,860	14,160	2.73	1.25	124,165	50,438
107,084	19,366	10,663	2.02	1.15	113,886	50,717
100,263	38,500	12,276	2.41	.95	116,552	51,398
60,831	19,106	9,941	2.20	.92	62,609	24,027
27,538	7,866	1,797	.40	.29	23,695	9,188
7,010	1,752	1,093	.44	.35	8,758	3,008
5,057	812	663	.26	.25	6,599	2,490

*Based on the number of shares outstanding at the end of each year (excluding shares reacquired and held in the treasury) and restated for comparative purposes on the basis of the 3 for 1 split in June, 1951; 2 for 1 in May, 1945 and 3¼ for 1 in 1942.

**After depreciation.



Molds, Molecules...and Men

A company like **Pfizer** needs chromatographers

nutritionists

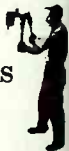


and medical doctors,



For some jobs at **Pfizer** you need the specialized

own two hands



and clerks, chemical engineers and specialists in organic synthesis,



radiochemists and statisticians ...the range of skills is almost endless.



education of a Ph.D. For others you need only your



as well as the competence and initiative expected of everyone.



Pfizer offers employees group hospital and life insurance, retirement income and a full range of other benefits.

The fact that Pfizer has been growing so fast is proof enough that there's plenty of room to get ahead. In pre-war days, the Company had about 600 employees, most of them in Brooklyn. Now there are more than 10,000 throughout the United States and in countries around the globe. Pfizer can boast one of the lowest employee turnover rates in industry. That's another good earmark of opportunity.

There's satisfaction in working at Pfizer, too, when you know you're contributing to human well-being.



Facts About Pfizer—1957

Pfizer Marketing Organization

PFIZER LABORATORIES DIVISION

Antibiotics, hormones, synthetic medicinals, other ethical pharmaceuticals, proprietary specialties, veterinary medicines.

J. B. ROERIG AND COMPANY DIVISION

Vitamin and mineral preparations, and other nutritional and pharmaceutical specialties.

CHEMICAL SALES DIVISION

Food and beverage ingredients, antibiotics, vitamins and other medicinals, and industrial chemicals—all in bulk.

AGRICULTURAL SALES DIVISION

Antibiotics, vitamins, hormones and other growth-promoting factors for livestock feed supplements, animal and plant health products.

INTERNATIONAL SUBSIDIARIES

Antibiotics, hormones, synthetic medicinals, pharmaceuticals, vitamins, nutritional preparations, agricultural products and fine chemicals.

Principal Pfizer Locations

IN THE UNITED STATES

Executive Offices:

11 Bartlett Street, Brooklyn 6, N. Y.

Manufacturing Plants and Laboratories (U.S.A.)

Brooklyn, New York

Terre Haute, Indiana

Groton, Connecticut

Maywood, New Jersey

Regional Sales Offices and Distribution Centers

Brooklyn, New York—630 Flushing Avenue

Chicago, Illinois—6460 West Cortland Street

San Francisco, California—1500 Sixteenth Street

Atlanta, Georgia—1151 Chattahoochee Avenue

Dallas, Texas—7600 Ambassador Row

Portland, Oregon—3333 N.W. Industrial Street

Los Angeles, California—4814 Loma Vista Avenue

IN COUNTRIES ABROAD

Headquarters, International Subsidiaries

800 Second Avenue, New York 17, N. Y.

Pfizer products are manufactured in:

Argentina

Australia

Belgium

Brazil

Canada

Chile

England

France

Germany

Italy

Japan

Philippines

Spain

Sweden



Brooklyn, N. Y.



Groton, Conn.



Terre Haute, Ind.

Summary — 1956

Net Sales	\$178,362,196
Net Earnings	18,253,979
Net Earnings per share of common stock	3.36
Cash Dividends per share of common stock	1.75
Total Assets	152,582,685
Employees	10,000
Shareholders	22,000

Board of Directors

George A. Anderson*	Maynard E. Simond
Allan J. Greene*	Edwin H. Smith
Jasper H. Kane	J. William Stuart
John E. McKeen*	J. Jerome Thompson
Herman A. Poitras	Thomas J. Winn
John J. Powers, Jr.*	

*Members of Executive Committee

Officers

John E. McKeen	<i>President and Chairman of the Board</i>
John J. Powers, Jr.	<i>Senior Vice President; President and Chairman of the Board, International Subsidiaries</i>
Allan J. Greene	<i>Vice President — Administration</i>
Herman A. Poitras	<i>Vice President — Production</i>
Jasper H. Kane	<i>Vice President — Research and Development</i>
Thomas J. Winn	<i>Vice President — Pfizer Laboratories and J. B. Roerig & Co. Divisions</i>
J. William Stuart	<i>Vice President — Personnel</i>
Edwin H. Smith	<i>Controller</i>
Jesse G. Heiges	<i>Secretary and General Counsel</i>
John F. Duffy	<i>Assistant Treasurer</i>



Agricultural Research Center



Philippines



England

Calendar of Progress

1849

Charles Pfizer and Charles F. Erhart form partnership to manufacture fine chemicals in Brooklyn, N. Y.

1862

First domestic production of tartaric acid and cream of tartar, vital to food and chemical industries, launched by Pfizer.

1880

Company adds citric acid, made from imported crude concentrates.

1882

Pfizer moves westward, opens a Chicago sales office.

1900

Pfizer is incorporated in New Jersey.

1914

Pfizer begins fermentation research.

1923

Pfizer opens commercial plant for full-scale citric acid production by fermentation.

1929

Pfizer becomes world's first company to develop, through fermentation, a method of mass-producing gluconic acid.

1936

Pfizer begins commercial production of synthetic vitamin C.

1941

Pfizer and other companies start exploration of practical method for large-scale penicillin production.

1942

First public offering of Pfizer stock.

1944

Large-scale penicillin production plant completed by Pfizer.

1946

Fermentation plant and research laboratories established at Groton, Conn.

1947

Facilities purchased at Maywood, N. J., now site of radiochemistry, parasitology and pharmacology laboratories.

Pfizer fermentation plant at Terre Haute, Ind., begins production.

Pfizer establishes international export department.

1950

Terramycin, broad-spectrum antibiotic discovered by Pfizer research team, is launched and an Antibiotic Division (now Pfizer Laboratories) established to market Terramycin under Pfizer label.

Antibiotic animal feed supplements developed.

1951

New dry, stable form of vitamin A developed by Pfizer.

First manufacture of Pfizer products abroad, in Belgium.

First Pfizer sales branches opened—Brazil, Mexico, Panama, Puerto Rico, Canada, Belgium, England.

1952

Agricultural Sales Division established; agricultural research center established outside Terre Haute, Ind.

Manufacturing begun in Canada, France and Japan.

1953

J. B. Roerig and Company, vitamin and mineral specialists, becomes division of Pfizer.

Manufacturing begun in England.

1954

Tetracycline (tetracycline), broad-spectrum antibiotic discovered by Pfizer researchers, is marketed.

Agri-mycin, effective against costly plant diseases, introduced by Pfizer.

Manufacturing begun in Spain, Germany, Brazil, Australia.

1955

Itaconic and kojic acids, first of new line of industrial chemicals, made available to industry on commercial scale for first time through Pfizer fermentation.

Viadril, first steroid anesthetic, developed in Pfizer's laboratories.

First fermentation plants abroad completed in Sandwich, England,

and Massy, France. Manufacturing begun in Philippines and Sweden.

1956

Sigmamycin, first multi-spectrum antibiotic, developed and marketed by Pfizer.

L-lysine, nutritional product made by unique fermentation process, placed on market.

Fermentation begun in Kobe, Japan. Manufacturing started in Argentina and Italy. New Canadian plant completed.

Announcement of new plants to be constructed in Italy, Turkey, Argentina, Mexico.

1957

Manufacturing begun in Chile.